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United States
Department of
Agriculture

Forest
Service

Southwestern
Region

July 1986

Summary of the Draft Environmental Impact Statement for the Kaibab National Forest Proposed Plan

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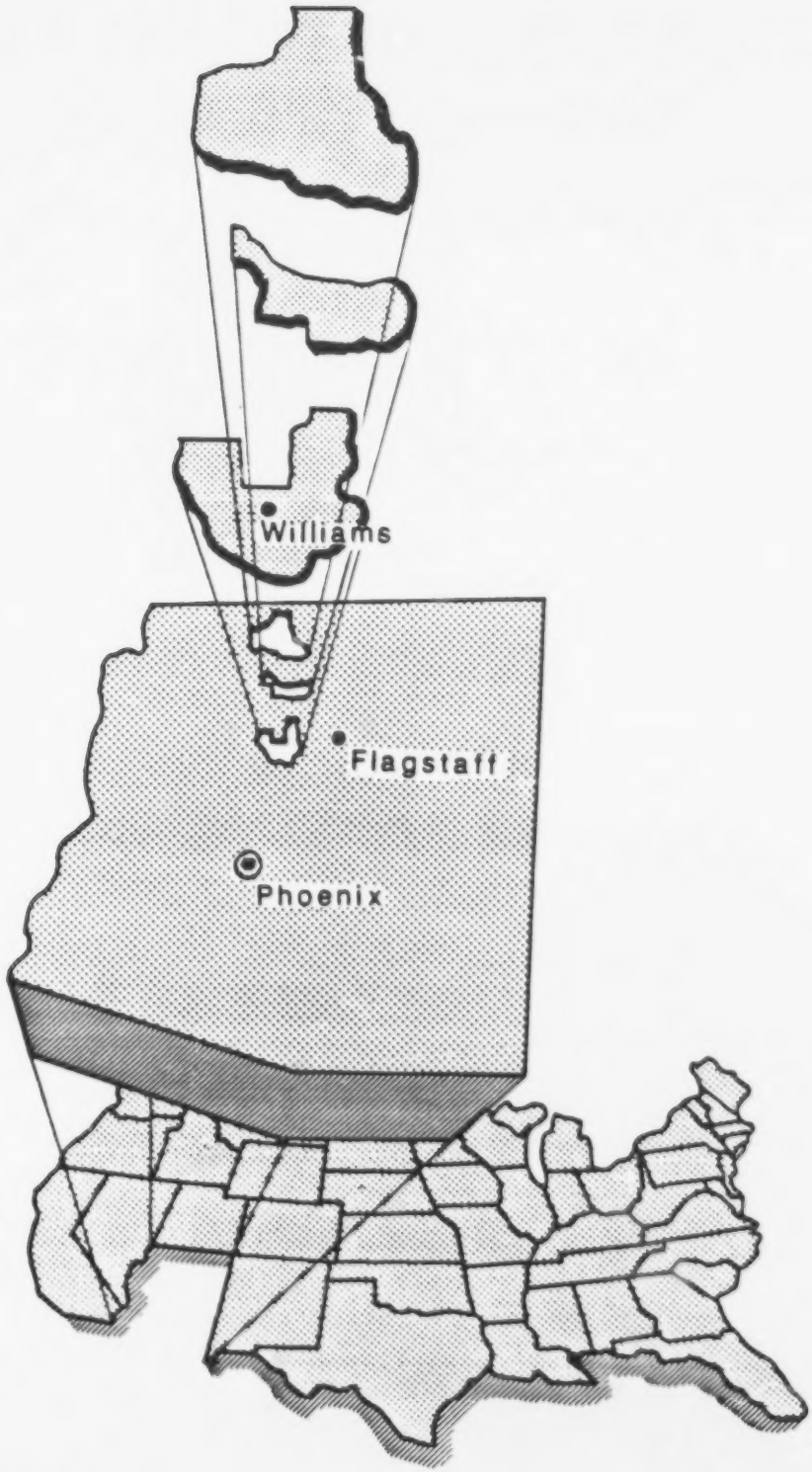
Vicinity Map



DRAFT ENVIRONMENTAL IMPACT STATEMENT

Proposed Kaibab National Forest Land and Resource Management Plan
Coconino, Yavapai and Mohave Counties

Type of Action	Administrative
Lead Agency	USDA, Forest Service
Responsible Official	Sotero Muniz, Regional Forester
For Further Information	L. A. Lindquist, Forest Supervisor Kaibab National Forest 800 South Sixth Street Williams, AZ 86046 (602) 635-2681

Abstract

A proposed action and five alternatives for a land and resource management plan (Forest Plan) for the 1,534,443 acres Kaibab National Forest are described and compared. The proposed action (PA) and alternatives are:

PA Designed to respond to major issues and management concerns with a mix of both market and non-market management emphases.

A Management is designed to provide resource production assigned to the Forest in the Regional Guide.

B Projects current resource management and production consistent with current budget levels.

C Emphasizes a non-commodity mix of management practices while providing at least the minimum production and protection of resources.

D Emphasizes a commodity-producing management practices while protecting, and enhancing the affected area.

E Maximizes net public benefits regardless of management emphasis, given the goal of protection of the affected environments and a budget ceiling.

The PA constitutes the Forest Service preferred alternative. The Forest Plan, when approved, will guide management of the Forest and will ordinarily be revised on a ten year cycle, or not more than fifteen years.

Comments should be sent to the Forest Supervisor, Kaibab National Forest. Comments must be received in the Forest Supervisor's office not later than close of business (4:30 o'clock, pm), _____.

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PLANNING RECORD

The Environmental Impact Statement and Kaibab National Forest Land and Resource Management Plan document the analysis and decisions resulting from the planning process.

The detailed documentation of the analysis, assumptions, and decisions are recorded in an extensive file and library referred to in the EIS and Forest Plan as the planning record.

The planning record contains the data, computer results, references, direction, and decisions that supported and drove the process. The planning record is often cited for further information on various subjects.

Appendix C of the EIS lists the technical reports that summarize, in detail, the phases of the planning process. The technical reports are incorporated by reference for purposes of analysis in the EIS and Forest Plan. The technical reports are available in the planning record.

The planning record is a public record. It is available for review during the hours of 8:00 a.m. to 4:30 p.m., Monday through Friday. Specific documents and general information from the planning record are available by writing:

Kaibab National Forest
Land Management Planning
800 South 6th Street
Williams, AZ 86046

Commercial Telephone: (602) 635-2681

A charge may be made to cover costs of such things as photo-copying, searching for information, and computer time.

Summary of the Draft Environmental Impact Statement

WHY A FOREST PLAN

The Kaibab National Forest (hereafter referred to as the Forest), like all other National Forests, is preparing a Land & Resource Management Plan (the Proposed Plan) which will determine its management direction for at least the next ten years. The Proposed Plan is required by law, specifically the Forest and Rangeland Renewable Resources Planning Act of 1974 as amended by the National Forest Management Act of 1976.

The Proposed Plan is designed to replace a number of other plans and guides developed to manage individual resources such as recreation, grazing, and timber. It will provide for multiple use and sustained yield of goods and services from the Forest to maximize long-term net public benefits in an environmentally sound manner. The public, members of various organizations, businesses, land managers from other agencies, and Forest Service employees have all been involved in the process leading to these documents.

The Forest is capable of providing a wide range of goods and services, but it cannot satisfy all needs and desires. Because of this, some tradeoffs have to be made between resources. These tradeoffs will ensure that scarce resources and dollars are allocated in a manner which provides maximum total benefits to society.

Part of the Forest's planning process involved determining the different levels of goods and services which could be supplied by the Forest and the effects on the environment of supplying those levels. A Draft Environmental Impact Statement (DEIS), which is required by the regulations for implementing the National Forest Management Act, displays a range of alternatives designed to satisfy human needs and desires to varying degrees and shows the environmental effects of implementing each of the alternatives. It also identifies one of the alternatives as the preferred alternative.

The DEIS and Proposed Plan will be reviewed and modified as necessary. The final Plan, when approved, will provide for management of the Forest for the next ten to fifteen years. However, it can be modified whenever necessary, and a revision is required by law every fifteen years.

THE PUBLIC'S ROLE IN PLANNING

Introduction: The National Forest Management Act, (NFMA) was passed on October 22, 1976. This act called for the preparation of land and resource management plans for units of the National Forest System. In addition, this law directed the Secretary of Agriculture to provide for public participation in developing, maintaining, and revising these plans. This report is the record of the activities regarding the formulation of public issues, management concerns, and resource use and development opportunities conducted by the Forest Supervisor and staff officers, and the process of development and preparation of the Land and Resource Management Plan for the Kaibab National Forest.

Public Participation: The unaccelerated portion of the land management planning process was carried out in accordance with the approved public participation plan. It formally began on September 12, 1980, with the publication of a Notice of Intent in the Federal Register. News releases were published in several newspapers inviting public participation. In addition, over 3,000 invitations were mailed to individuals and organizations known to use or to be interested in National Forest resources. This included timber sale purchasers, road maintenance and construction contractors, special use permittees, range permittees, fuelwood purchasers, and others that had expressed an interest in National Forest programs. A diligent search was made of the Coconino County tax and property records in order to ascertain owners of property adjacent to National Forest land. Invitations were sent to 246 adjacent landowners. In total, more than 3,100 individuals and organizations were invited to participate in the process. Public workshops were hosted in Tusayan, Fredonia, Williams, Flagstaff, Phoenix, and Tucson, Arizona, to inform the public of the planning process and to invite the public to recommend and suggest public issues, evaluation criteria, and resource use and development opportunities to be addressed in the planning process. Every party invited to participate in the process was provided with a booklet entitled "National Forests in Arizona - Issues, Concerns and Opportunities". This booklet presented basic factual

information regarding the budget and resource situation of each National Forest in Arizona. In addition, the booklet was formatted in a manner to invite written comment.

Consultation with Government Agencies and Indian Tribes: The scoping process involved federal, state, and local governmental agencies and Indian tribes. Meetings were held in Phoenix, Arizona, to stimulate consultation and provide for information exchange regarding the planning process between the forest officers and agency officials.

Consultation with Special Interest Organizations: Forest officers have also been involved in an on-going, informal consultation with the representatives of several special interest organizations. Foremost have been the USDA Forest Service consultation with representatives from the timber industry and wildlife and fish organizations.

Internal Consultation: In addition to the public workshops, the Kaibab National Forest hosted two workshops in Fredonia, Arizona, and two workshops in Williams, Arizona, for Forest Service employees. These workshops were intended to inform employees of the planning process, operations involved, the planning schedule, and obtain employee comment regarding issues, concerns, and opportunities. The period for public comment closed on December 8, 1980.

Public Issues, Management Concern, and Resource Use and Development Opportunities

The public issues, management concerns, and resource use and development opportunities approved by the Regional Forester on July 31, 1981, [see Appendix H] were revised in the summer of 1983 in order to structure them in accordance with Section II of the procedural direction of the Associate Deputy Chief in his 1920 letter to the Regional Foresters dated May 31, 1983. Public comment was approached in the revision process as essentially thesis and antithesis, e.g. point vs. counterpoint, output vs. trade-off, consumptive use vs. non-consumptive use, conflict vs. complement, etc. This process structured public comments [theses and antitheses] into public issues, management concerns, and resource use and development opportunities.

These problem statements are the public issues, management concerns, and resource use and development opportunities for the Kaibab National Forest. They are the fruit of the public involvement, scoping, and comment analysis process. These problem statements establish the nature and scope of the planning and analysis process. Forest resource planning develops alternative solutions, i.e. syntheses, for these problem statements. Analysis measures problem resolution of each alternative using the set of evaluation criteria. Decision making selects a particular alternative for implementation.

The following public issues, management concerns, and resource use and development opportunities, and evaluation criteria were approved by the Regional Forester on October 13, 1983, for use in the land and resource planning process for the Kaibab National Forest. Public Issue 13, Minerals Management, and its Corresponding Evaluation Criteria, were subsequently approved by the Regional Forester on May 22, 1985.

Commercial Timber: Provide for sustained level of timber outputs to support local dependent industries. Increase yields through intensive reforestation, timber stand improvement, thinning, and harvesting practices to improve stand stocking and to eliminate age-class imbalances and insect and disease problems. However, other competing forest values, such as wildlife habitats, visual resources, soil and watershed maintenance and protection and concern for the safety and welfare of forest visitors can delay or eliminate increases of timber yields, and reduce financial returns to the federal and local governments.

The results of certain silvicultural practices, [timber stand improvement cuttings, site preparation, and reforestation] and harvesting methods, [commercial thinning, clearcutting, and shelterwood cutting] concern many people who fear [1] depletion of growing stock, [2] erosion and declining soil productivity, and [3] impacts on watershed condition, visual resources, forage production, and wildlife habitats. Opportunities exist for improving the administration and application of silvicultural activities and logging practices and for changing the diversity and distribution of timber stands in terms of stand size, species composition, age composition, tree sizes, and stocking levels, and patterns.

Fuelwood: Demand for fuelwood continues to increase; however, total use and availability are not well-measured. Some preferred fuelwood sources, such as pine

snags, oak, and alligator juniper are in short supply and there is potential to damage resources if overcutting takes place. Significant amounts of ponderosa pine logging slash and similar residues are produced in harvesting and cultural operations and must be treated for disposal. Increased substitution of these materials for preferred sources may improve economic efficiency and forest protection.

Range: Provide for sustained level of range outputs in support of local ranches. Significant amounts of rangeland are in unsatisfactory condition in spite of adjusting the number of animals grazed relative to grazing capacity. Recovery of depleted rangeland is slow in many areas because of degraded soil conditions, poor plant composition, and lack of structural range improvements. Range management ativities and rangeland improvement activities may impact wildlife habitats, watershed condition, visual resources, and contribute to soil erosion and declining soil productivity. Opportunities exist for (1) more intensive range allotment management regimes, (2) rangeland improvements through public and private investments, (3) adjustments of grazing use in line with grazing capacity, and (4) the management of a wild burro territory.

Watershed: Many watersheds have significant acreages in unsatisfactory condition with declining soil productivity because of such factors as oxidation of soil organic matter, lack of vegetative cover, compaction, soil surface crusting, and erosion. Soil and watershed maintenance and improvement practices have the potential to impact wildlife habitats, visual resources, and yields of other resource outputs; however, opportunities exist for direct watershed and soil resource improvements.

Developed Recreation: Some existing recreation developments are deteriorating because of overuse or age, eventually resulting in loss of capacity and uneconomic sites. Opportunities exist for reversing this trend and for increasing developed site capacity through expansion of existing sites and construction of new sites through public and private sector investments.

Downhill Skiing: Significant public interest exists for the development of alpine ski facilities. An opportunity for a ski area exists on Bill Williams Mountain. Capture of this opportunity may impact wildlife habitats, visual resources, watershed condition, and the yield of other resource outputs.

Dispersed Recreation: There are opportunities for meeting increased demand for dispersed recreation through the development of hiking trails, horseback riding support facilities, cross-country ski trails, off-road vehicle areas, intrepretative sites and materials, scenic view points, and dispersed water developments. Dispersed recreation use and management practices may impact wildlife habitats and reduce yields of other resource outputs.

Lands suitable for primitive, semi-primitive non-motorized and semi-primitive motorized recreation opportunities are limited in area and distribution in this National Forest. There are opportunities for both increasing the amount and improving the distribution of lands suited for these particular recreation opportunities. However, changes in the existing spectrum of recreation opportunities may effect the yield of other resource outputs.

Off-road vehicle use can adversely impact particular areas with important and sensitive wildlife, visual resource, and soil and watershed values. Opportunities exist for control of off-road vehicle activities where these resource values are adversely affected.

Transportation System: There is significant public interest regarding the design standards, location, density, maintenance standards, and cost of both permanent and temporary roads. In addition the public has expressed concern regarding restricting access to forest lands and the resources thereof; however, there is also public recongnition that unrestricted access to National Forest lands has sometime resulted in damage to the road system, vandalism of other facilities, and adverse impacts to visual, soil, watershed, and wildlife resources.

There are continuing requests for providing commercial air services between the northern portion of the Kaibab National Forest and nearby air terminals. Commercial air services may impact visual, soil and water, and wildlife values, safety and welfare of forest visitors, and result in noise and air degradation. In addition these kinds of services may be incompatible with the management emphasis and

resource management direction for the neighboring north rim area of Grand Canyon National Park and thereby adversely affect National Park programs.

Wildlife Habitat: In some areas, past activities such as timber harvest, snag removal, overgrazing, and road construction have degraded wildlife habitats. Opportunities exist for direct wildlife habitat improvements to restore and provide for quality habitats in many areas of the forest. Wildlife habitat improvements have the potential to impact soil and watershed, timber, visual, and range resources.

Cultural Resources: Cultural resource management for this National Forest is a narrowly defined program generally limited to site avoidance. In spite of increased effort to protect and identify cultural resource sites there are continuing losses of cultural resources from vandalism and accidental destruction. Inventoried cultural resource sites are not being evaluated for final disposition, i.e. nomination to the National Register, continuing protection, salvage, etc. Until these evaluations are completed, blanket protection of all sites is necessary.

A portion of the Beale Wagon Road is situated within this National Forest. The National Trails System Act, as amended, requires evaluation of this "road" as a National Historic Trail. A recommendation for administrative action regarding designation of the Beale Wagon Road as a National Historic Trail is necessary. Designation of this road as a National Historic trail may affect the yield of other resource outputs.

Wilderness and Special Areas: The Arizona Wilderness Act of 1984 established three wilderness areas in this National Forest. Management direction is necessary to guide the use and management of these areas to protect and maintain their wilderness character and value.

The opportunity exists to establish an Arizona Fescue Research Natural Area. Allocation of land for this purpose may reduce or eliminate the yield of other resource outputs. Evaluation of the opportunity to establish this special area and a recommendation for administrative action is necessary.

Land Ownership Adjustments: Many administrative problems, such as road access, utility rights-of-way, and property encroachment, occur on National Forest lands that are adjacent to lands in other ownerships. This situation is most acute and concentrated in the vicinity of the established communities of Williams and Tusayan. Opportunities exist to adjust the pattern of National Forest land ownership in the vicinity of these communities in order to allow economic growth and improve National Forest administration.

Minerals Management: Mineral activities sometimes conflict with other resource values and uses. There is need to (1) ensure access for mineral development and (2) provide adequate protection of special resource values. Mineral withdrawals and surface use and occupancy restrictions can prevent or reduce resource conflicts associated with mineral exploration and development activities.

Oil and gas lease recommendations, including any special surface use stipulations, must be made for pending and future lease applications.

These components of issues will be resolved outside the forest planning process:

Downhill Skiing: The planning and analysis for the development of a ski area on Bill Williams Mountain is address in seperate environmental impact statement.

Minerals Management: The planning and analysis for the proposed Canyon Mine is addressed in a seperate environmental impact statement.

Physical and Biological Setting

The Kaibab National Forest is one of 11 National Forests in the Southwestern Region, and one of 154 National Forests in the United States. The Forest was formed in 1934 by combining the Kaibab and Tusayan National Forests. These Forests had been formed by various boundary changes and additions to the Grand Canyon Forest Reserve (created by Presidential proclamation in 1893) and the San Francisco Mountains Forest Reserve (Created by Presidential proclamation in 1898).

Physiography. Because of its physical location and dramatic differences in elevation, the Forest includes a wide variety of landforms and plant and animal habitats.

The northern one-third is generally dominated by the high Kaibab Plateau surrounded by the rugged canyons of the Colorado River and its tributaries. The plateau reaches 9,200 feet elevation and is distinguished by its sinkholes and long open valleys characteristic of karst topography. The lowest elevation in Jumpup Canyon is approximately 3,000 feet.

The southern two-thirds of the Forest is part of the Colorado Plateau, dominated by many cinder cones and volcanic peaks. Elevations range from about 4,800 feet in Sycamore Canyon to 10,418 feet at the top of Kendrick Peak, the highest point on the Forest.

Climate. Four principal climatic zones are found within the Forest; boreal, cold temperate, warm temperate, and semi-arid. The boreal zone is generally the area above 8,500 feet and is characterized by mixed conifer forests. Average annual temperature is 39° F and precipitation ranges from 24 to 32 inches per year. The cold temperate zone lies between 7,000 and 8,500 feet and is dominated by ponderosa pine forest. Average annual temperature is about 43° F and precipitation ranges from 18 to 24 inches annually. The warm temperate zone, characterized by pinyon-juniper woodland, generally lies below 7,000 feet, averages 54° F, and receives 14 to 18 inches of precipitation annually. The semi-arid zone typically ranges in elevation from 3,000 feet to approximately 4,000 feet. Average annual temperature is 61° F, and the zon receives eight to twelve inches of precipitation. The growing season ranges from 80 days at the high elevations to 180 days in the warmer zones.

Geology and Soils. The Forest is in the Flagstaff and Grand Canyon sections of the Colorado Plateau physiographic province. Soils of the North Kaibab and Tusayan area have developed mainly from the Permian Kaibab limestone or Coconino sandstone of the Paleozoic era. On the southern part of the Forest, soils are derived principally from extrusive igneous rocks of the Quaternary and Tertiary periods. Major igneous rocks are basalt, cinder, and rhyolite.

The soils are variable in rock and clay content, depth, organic matter content, pH, fertility, color, and erosion potential. This wide variation is the result of differences in vegetative types, climatic conditions, topography, and varied parent rocks.

Vegetation. Vegetation varies from the Engelmann spruce and subalpine fir at the highest elevations to blackbrush in the lowest desert zone. In between, vegetation is represented principally by ponderosa pine forest and pinyon and juniper woodland. Big sagebrush is a characteristic component of the woodland zone in the northern one-third of the Forest.

Ponderosa pine with some interspersion of Gambel oak covers the majority of the commercial timber lands. Isolated stands of aspen occur throughout the commercial timber lands, as do various grassland communities. The pinyon-juniper woodlands consist of pinyon pine, Utah juniper, and one-seed juniper with some alligator juniper at the higher elevations. Seral grasslands are intermixed in the pinyon-juniper woodland zone.

The lowest and driest vegetative zone consists of the desert grassland and desert shrub plant communities, primarily blackbrush, galleta, Indian rice-grass, and sand dropseed. Within this zone an area of riparian vegetation consisting principally of Fremont cottonwood, salt cedar, and mesquite is found.

SOCIAL AND ECONOMIC SETTING

The primary social and economic zone of influence for the Kaibab National Forest is Coconino and Yavapai Counties. The Forest covers over 1.5 million acres in these two counties, with about 5,000 acres in Mohave County. Forest influenced activities and outputs are associated with less than 5 percent of the total employment in Coconino County. Yavapai and Mohave Counties are not significantly affected economically by activities on the Kaibab, but Forest use by people from those areas is important to Coconino County. Another primary source of significant effect is from the Phoenix metropolitan area in Maricopa County.

The Kaibab is within the zone of influence of several Indian tribes. Bordering land areas include the Navajo and Havasupai homelands. Nearby groups include the Hopi, Kaibab Paiute, Yavapai-Prescott and the Hualapai. All of these groups have a

history of aboriginal use of parts of the Kaibab, and for some, there is still active use of the Forest for recreation, gathering of fuelwood and other material, employment, and road and trail access to their homes. Parts of the Forest have historical, religious, or other traditional significance to these people.

The Salt River Valley and the Colorado River Valley are considered to be a secondary zone of influence. People from these areas are within a reasonable driving distance of the Kaibab, therefore, a good proportion of Forest use is from those areas for recreation, climatic relief, some employment, and product gathering.

Population. Four sub-areas have been identified for the Kaibab zone of influence. The first consists of Flagstaff and Prescott. Both cities are among the faster growing communities in the state with their combined populations approaching 55,000.

Principal employment sectors are government, wholesale and retail business, followed closely by seasonal tourism. Both communities rely on Forest lands to a large extent for recreational activities, such as camping, skiing, hunting and sightseeing.

The second population includes Williams, Ashfork and Parks, and the surrounding rural subdivisions. These residents depend primarily on retail sales and services to travelers and tourists and small industry, including lumber, pulpwood harvest, and rock quarries. This area also has many summer home owners, retirees, and rural lifestyle residents who commute to jobs in other areas, or live on a subsistence level, using the Forest for recreation, fuelwood and as a wildland backdrop for their homes.

In the Grand Canyon-Tusayan Village area, employment is heavily oriented around the tourism and transportation services connected with the National Park and the Grand Canyon Airport.

The Fredonia-Kanab-Page area is similar to the situation at Williams where the local economy is heavily dependent on retail sales and services to tourists. More industry exists, or is under development, and there is a greater potential for higher levels of personal uses of the Forest by the growing population.

Table 1 displays population trends for the primary zone of influence. The population of the area is expected to almost double between 1980 and 2000. Recent studies show that, nationally, population growth is most pronounced in the west, with the northeast actually losing population. People are, and will continue to be, attracted to western states, especially sunbelt states like Arizona because of the climate, scenery, variety of outdoor recreation activities, natural resources, and the booming economy.

Table 1. Population Trends for Areas Influencing the Kaibab National Forest

Year	State of Arizona	Coconino County	Yavapai County	Maricopa County
1950	749,587	23,910	24,991	331,770
1960	1,301,161	41,857	28,912	663,510
1970	1,775,399	48,326	37,005	971,228
1980	2,718,000	75,008	68,500	1,500,000
2000	4,751,000	130,500	131,500	2,883,000

Employment and Income. In 1979, the per capita income was $7,155 in the zone of influence. From 1920 to 1977, Coconino County's personal income rate grew at an average annual rate of 13.9 percent, and Yavapai County's at 15.9 percent, compared to a national average of 9.8 percent. On a per capita basis, both counties have grown closer to the national average for per capita personal income; Coconino at 74 percent and Yavapai at 87 percent of the national average.

The June, 1984, unemployment rates for the two counties were; Coconino County, 8.2 percent, and Yavapai County, 7.4 percent. The total labor force was estimated to be 85,575, of which 80,350 were employed, and the overall unemployment rate was 7.8 percent.

The National Forest has a number of direct and indirect effects on the economy of the area. For example, a total of 600 workers are employed in the timber industry directly dependent on timber provided by the Kaibab National Forest. This employment is significant to local communities such as Fredonia where over 75 percent of employment is connected directly with the timber industry. In Williams almost twenty percent of the local employment is timber connected. This activity has a direct multiplier effect on the economy, both locally and regionally, so that a total of sixteen million dollar value of forest products manufactured by dependent industry is significant to Arizona. During 1984, the total collections by the Kaibab National Forest which were paid to local counties amounted to $4.1 million.

Tourism is the largest economic activity in the area, and it has been estimated that about thirty percent of the outdoor recreational use in the state takes place in Coconino County. Although a good portion of this figure is due to Grand Canyon National Park, other attractions such as National Forests bear a considerable part of this use. About 28 percent of the land in Coconino County is National Forest.

Lifestyles. The National Forest not only provides direct economic benefits, but is the landscape setting for a way of life which is significantly different from many areas of the country. Here the public lands provide open space as a setting, with recreational opportunities to residents of the area as well as to visitors. Freedom to hunt, fish, hike or to gather fuelwood for winter warmth are significant values to the people of Northern Arizona.

Lifestyles for the most part are influenced by strong frontier values of self-reliance and the rights of individuals. This also influences attitudes about land use toward personal values and perceptions. People are concerned about land use decisions and are jealous of their rights to free access and enjoyment without interference by others.

People who live within or close to the Forest are most interested in and affected by resource management. They may own a cabin, backpack, ski, snowmobile, fish, gather fuelwood, hunt, hike, camp, or picnic. If they gather fuelwood, the fresh air and exercise will probably be as important to them as the economic value of the wood. The Forest substantially enhances their quality of life. These people have a proprietary interest in Forest management decisions and resource uses.

Some people earn all or part of their income from the Forest. They depend on such things as timber harvest, mining, grazing livestock, operating a service business in the Forest, outfitting and guiding, or cutting poles, posts, or fuelwood for their own living.

Another substantial group of people are visitors to the Forest from out of state or from the large population centers of Arizona. They are interested in the climatic relief the area provides from desert heat, or in the scenery, wildlife, or other natural features of the area. To them, the Forest may be an outdoor museum, a wilderness backdrop for their recreation, or a sanctuary for plants or animals they feel must be protected.

ALTERNATIVE DEVELOPMENT PROCESS

A broad range of alternatives was formulated by the "interdisciplinary team" (ID team) using a specific and structured analytical process as required in the planning regulations [36 CFR 219.12(e) and (f)].

Analysis Areas. For analysis purposes the Forest was subdivided into units of land called analysis areas. Analysis areas (AA's) were identified based on the issues, biological capability, suitability for management practices, economic factors, and prior allocations.

Prior Allocations. Part of the planning process included evaluating existing allocations of land and evaluating previous plans to determine whether or not they still apply. Some areas of the Forest are subject to specific laws, regulations, or cooperative agreements. The following text lists these areas and the status of previous plans.

Congress established the 47,782-acre Sycamore Canyon Wilderness on March 6, 1972. This wilderness was expanded by additions August 24, 1984 to a total of 55,942 acres. The wilderness is located within three Forests; the Coconino, Kaibab and Prescott National Forests. The Coconino Forest Plan provides management direction for the Sycamore Canyon Wilderness.

In the passage of the Arizona Wilderness Bill (August, 1984), three backcountry areas on the Kaibab National Forest were set aside as Wilderness: 40,600 acres in the Saddle Mountain Wilderness; 67,760 acres of the Kanab Creek Wilderness; and, 4,310 acres of the Kendrick Mountain Wilderness. The remaining 9,019 acres of Kanab Creek are managed by the BLM, and the remaining 2,200 acres of Kendrick Mountain are within the Coconino National Forest. The Kaibab Forest Plan provides management direction for the Kendrick Mountain Wilderness.

The Forest Plan incorporates the analysis made in the environmental impact statement on the Bill Williams Mountain Ski Area Proposal in its entirety. While the decision process represented by this EIS is still not final, the proposal is incorporated by reference for the purposes of analysis in the EIS and Forest Plan.

There are two sites currently listed on the National Register of Historic Places.

There are two designated National Recreation Trails; Camp Clover and Benham. The Beale Wagon Road is designated a National Historic Study Trail (1983) and is evaluated for historic trail status in a technical report and recommended as an historic trail in the Forest Plan.

The Grand Canyon National Game Preserve was established in 1906 and this status still exists on 612,736 acres of the National Forest. The Game Preserve was "set aside for the protection of game animals and birds" and is to be "recognized as a breeding place therefore" [16 USC 684-687]. On areas within this designation "hunting, trapping, killing, or capturing of game animals and birds...[is] unlawful, except under such regulations as may be prescribed... by the Secretary of Agriculture." However, by agreement with the Arizona Game and Fish Commission, wildlife resources are developed and managed on this area in cooperation with the State to include sport hunting. Under the agreement, the state manages wildlife populations under Arizona State law, and the Forest Service gives priority to wildlife in maintaining proper habitat conditions. Under game preserve status the area is closed to mineral entry, but is administered for the other uses for which National Forests are established.

A review of these prior land allocations showed them to be appropriate. These areas were retained in all alternatives with no further analysis.

Management Prescriptions. Management prescriptions are combinations of management practices, activities, and standards and guidelines designed to achieve specific multiple-use goals and objectives. Management prescriptions include the necessary resource coordination measures required by laws, regulations, and policies. A number of different management prescriptions were developed to emphasize individual resource potentials, to portray current management, to manage at reduced intensity, and to address the issues in a variety of ways.

The prescriptions considered are discussed in Appendix B. Some prescriptions are mutually exclusive, or were not considered in some of the alternatives. Only the prescriptions used in the preferred alternative are presented in the proposed Forest Plan. A description of the full range of prescriptions considered in other alternatives is available for study at the Kaibab National Forest Supervisor's Office.

Benefits and Costs. Resource outputs and costs of implementation for management activities and practiceswere estimated for each combination of management prescriptions and analysis areas. Refer to Appendix B for a complete listing of the resource outputs and cost categories that were used in the analysis.

Cost estimates for each management prescription were developed from historical records of Forest Service costs and best professional judgement. Non-Forest Service costs for grazing permittee investment necessary to carry out range allotment agreements were also included in the analysis.

The resource outputs that have an existing market and are sold, as well as those resource outputs that could potentially be sold, were assigned benefit values and are called "priced benefits." Timber, fuelwood, dispersed, developed, wildlife, and wilderness recreation, livestock grazing, and water yield were assigned benefit values. All benefit values were based on the point in the production process when the resource is removed from the Forest. Refer to Appendix B for a complete listing of the values used.

No attempt was made to assign benefit values to many other outputs such as visual quality, threatened and endangered species, changes in income and employment, or community lifestyles. These kinds of outputs produce "non-priced" benefits that were also considered in the analysis. Non-priced benefits were considered as constraints or restrictions on the production of priced benefits.

Present Net Value. The priced benefits and the costs of management practices and activities were used to calculate the present net value (PNV) of the alternatives considered in the analysis. PNV is the difference between the value of the priced benefits and the value of all costs, discounted to the present at four percent real discount rate.

Looking at PNV is a means of comparing several different investment opportunities to see which would give the best dollar return. PNV is calculated from the sum of the benefits--the quantity of priced outputs multiplied by the benefit value--minus the sum of the costs necessary to produce the priced and non-priced outputs. The process is roughly equivalent to a private firm or family estimating its income and expenditures over a period of years. Since the dollars that are being added occur over a period of years, some adjustment must be made so they are comparable. A dollar in income now is worth more than a dollar of income ten years from now. The mechanical process by which these dollars are adjusted back to the present year so they can be compared is called "discounting." The discount rate used in Forest planning was established by the chief of the Forest Service.

PNV is a relative indicator of economic efficiency and was used as a means to develop and compare alternatives. One objective in developing each alternative was to maximize PNV. Each alternative is the most economically efficient combination of management prescriptions that will achieve a given set of priced and non-priced goals and objectives.

Net Public Benefits. The NFMA Regulations (36 CFR 219.1) describe the objective of land and resource management planning on National Forest System (NFS) lands:

> The resulting plans shall provide for multiple use and sustained yield of goods and services from the NFS in a way that maximizes long-term net public benefits in an environmentally sound manner.

Since not all costs and benefits can be priced in the analysis, PNV was not the only index used to develop, compare, and evaluate alternatives. Alternatives were evaluated to determine how well they maximized net public benefits. Net public benefits (NPB) is an overall expression of the value to the nation of outputs and positive effects (benefits) less associated inputs and negative effects (costs) whether they can be quantitatively valued or not. Net public benefits are measured by both quantitative and qualitative criteria rather than a single measure or index such as PNV. Alternatives having the highest PNV may not always provide the highest net public benefits when non-priced benefits and costs are considered.

Computer Model. The goal in alternative development was to find the most economically efficient combination of management prescriptions that would achieve a given set of priced and non-priced goals and objectives.

A linear programming model called FORPLAN was used as a tool to do the millions of calculations to test possible combinations of areas, prescriptions, and schedules that would maximize economic efficiency (PNV) while meeting the priced and non-priced goals and objectives specified for a given alternative. Goals and objectives for each alternative were determined on the basis of legal requirements, policies, issues, and desired levels of priced and non-priced benefits and costs.

In some cases, the FORPLAN model indicated the Forest could not be managed to meet some combinations of objectives. The limitations of land and resources, an impact on environmental quality, or the practical limits of budgets sometimes caused an infeasible solution. The ID team then modified the objectives and asked the

computer model to find other solutions for the particular combination of lands, activities, and schedules that would best meet the objectives of that alternative.

FORPLAN solutions were looked at by the ID team to see if the solutions were workable. Because FORPLAN is only an aid for analysis that does not model all components of net public benefits, adjustments in final solutions were made by the ID team based on professional expertise and prior experience. While the alternatives may not exactly match final FORPLAN solutions, relative differences between alternatives have not been effected. Refer to Appendix B for more detailed discussion of the FORPLAN model and constraints used.

Analysis of the Management Situation. During the analysis of the management situation (AMS), the Forest's current management situation was compared and evaluated against the Forest's potential to supply goods and services as demonstrated by the maximum benchmarks. This analysis provided a basis for evaluating the need for management changes and developing alternatives. The AMS contains much of the documentation for procedural requirements specified in 36 CFR 219, particularly the requirements to be covered in the planning process. The AMS is summarized in Chapter 3 of the EIS, in Chapter 3 of the Forest Plan, and is available in its entirety in the planning record.

Alternative Formulation. Appendix B contains greater detail concerning the formulation of alternatives.In brief, the ID team formulated alternatives by:

Developing a broad range of prescriptions that represent minimum to maximum resource production potentials and expenditures, and which also meet management requirements designed to protect and enhance long-term productivity;

Formulating benchmark alternatives to define the high and low limits or the "decision space" within which alternatives considered in detail were developed; and

Defining goals and objectives for tentative alternatives to be considered in detail by using the range of outputs determined by the benchmarks, issues and concerns to be addressed, cost efficiency, financial feasibility, and non-priced benefits.

ALTERNATIVES CONSIDERED IN DETAIL

Each alternative considered in detail meets the requirements of the NFMA regulations and provides goods and services at a level responsive to all or part of the issues while maximizing present net value. Appendix B describes the model constraints used in formulating the alternatives including alternatives not considered in detail.

The following objectives are common to alternatives:

- Meet the minimum legal management requirements specified in 36 CFR 219.27 in accomplishing goals and objectives of the alternative, including protecting soil and water resources, maintaining habitat to assure viable fish and wildlife populations, and maintaining and improving T&E species habitat;
- Provide for some degree of resolution of all identified issues, within a budget constrained to meet expected levels of financing for the first decade. This constraint was set at $8.1 million annually for all alternatives except the no action (Alternative A).
- Allocate land for the potential development of the Bill Williams Ski Area as defined in a separate EIS.
- Maintain existing representations of ROS classes;
- Maintain existing electronic sites and corridors;
- Provide lands for expanding communities surrounded by NFS lands;
- Recommend establishing Garland Prairie Arizona Fescue Research Natural Area (RNA);
- Maintain an adequate amount and distribution of wildlife habitats throughout the range for all existing native vertebrate species;

— Continue to identify and protect habitats for sensitive, threatened, or endangered plants and animals;

— Implement integrated stand management in all vegetative treatments;

— Achieve a balance between livestock permitted grazing use and grazing capacity;

— Manage range in wilderness areas at management level C;

— Maintain wild burro territory as presently established, within carrying capacity, and consistent with other uses and values;

— Manage fuelwood harvest levels from coniferous forest (including pinyon-juniper woodland) on a long-term sustained yield basis. Collect better information to improve management of coniferous woodland.

In addition to the objectives listed above, the following timber harvest constraints were common to all alternatives to comply with requirements of 36 CFR 219.16(a)(1), (a)(2)(iii), and (a)(2)(iv): non-declining yield (NDY); allowable sale quantity-long term sustained yield capacity link (ASQ-LTSYC); and perpetual timber harvest (ending inventory); and that all stands have reached culmination of mean annual increment (CMAI) before even-aged regeneration harvest.

In project areas, complete cultural resource (CR) surveys, site inventories preliminary site evaluations and consultation with the State Historic Preservation Office (SHPO), and where appropriate with the advisory council, tribal councils and others. Complete project clearance and provide protection of cultural resources through site avoidance, stabilization or other measures as appropriate. Complete compilation of a Forest cultural resources overview.

The 1983 amendment to the National Trails Act (PL 98-11) designated the Beale Wagon Trail from the vicinity of Winona, Arizona, south of state route #15 to the vicinity of Eagle Nest Mountain, as a trail to be studied for national historic importance. The revised Region 3 interim directive #11 assigned the lead effort of the study to the Kaibab National Forest. The twenty-three miles of trail is classified as eligible for "national historic trail" status according to section 5 of the Act. The route is eligible for placement on the National Register of Historic Places and is currently protected by Executive Order 11593.

Issues developed during the scoping process and the response to objectives assigned in the Regional Guide are addressed differently in each alternative. These differing emphases are reflected in the varying mix of management prescription assignments among alternatives. The "proposed action", RPA, and the "no action" alternatives are identified. The FORPLAN model projects resource outputs for 200 years. Resource outputs are displayed for up to fifty years.

The location of areas to be managed under differing prescriptions for the "proposed action" and other alternatives is displayed on the maps that accompany this document.

Range of Alternatives Considered. Each alternative was developed using a differing approach to resolve the issues. It is obvious from examining the issues, that no issue can be completely resolved ultimately without effecting the resolution of some other issue. Therefore each alternative was developed around an overall theme that considered some particular group of issues for emphasis. Separate objectives were developed for each theme, and then each alternative was constructed using sets of management prescriptions designed to fit those objectives. Minimum management requirements were included in all prescriptions. Every alternative therefore resolves each issue to some degree and meets all minimum management requirements. The alternatives considered represent a broad range of reasonable alternatives.

The limits for developing the alternatives were the potential resource production levels achieved by the benchmarks. In all alternatives, a maximum cutoff level was set by either the maximum single resource benchmark, or by expected limits of demand. For example, demand projections for developed recreation use were established based on analyses of past use. The demand projections represent the maximum level of output the Forest could sustain given an unlimited supply of developed recreation capacity. The "low budget" benchmark established the base level for most outputs, with subsequent alternatives providing outputs at or above this level.

Proposed Action (PA)

The "proposed action" (PA) is the proposed Forest Plan that was developed after analysis of the other alternatives. It was designed to emphasize improvement of land productivity and the protection of resource values, while providing for moderate increases from current levels of output for timber, fuelwood, and recreation. It is cost effective, while using state-of-the-art practices for the improvement of wildlife habitats, visual quality and watershed condition. The budget is limited to $8.1 million annually in the first two decades. Other objectives for this alternative, relative to the issues, are:

Commercial Timber

Of the total tentatively suitable, land, ninety percent is managed for timber harvest. Growth is 73 percent of the long term sustained yield capacity (LTSYC), in order to better resolve wildlife habitat issues and concerns. Suitable lands are managed to improve age class distribution, stand health and vigor, and to reduce losses from western spruce budworm, dwarf mistletoe, and other forest pests. Following intermediate harvests to specified growing stock levels, stands are seeded to improve forage production.

Wildlife habitats are improved by incorporating diversity goals into silvicultural prescriptions, by reducing the suitable acres allocated to timber harvest, by assigning acres to extended rotations for development of old-growth characteristics, by protecting special habitats such as snags, old-growth, etc., and by increased levels of direct habitat improvement work.

Reliable information is collected from unsuitable and suitable lands that is useful for long-range planning and operational planning.

A sustained level of timber outputs is provided to support local dependent industries. The annual allowable sale quantity of sawtimber and roundwood is 73.3 MMBF.

Fuelwood

Commercial and personal-use fuelwood programs are concentrated in the pinyon-juniper woodland. These programs are used to accomplish timber management objectives, wildlife habitat, soil and watershed, and range forage improvement projects. Increased substitution of conifer residues for the preferred fuelwood sources is encouraged. Fire hazard is reduced.

Reliable information is collected concerning fuelwood resources that is useful for long-range planning and operational planning.

Demand for commercial and personal-use fuelwood is met in the first decade. The annual fuelwood harvest of green pinyon-juniper from the woodland is 8.8 MMBF. In addition, 8.2 MMBF of coniferous residues of timber harvests are available for free and personal-use fuelwood programs.

Range Grazing

Balances grazing use with capacity by the end of the first decade. Gains forage improvement through watershed improvement projects and through fuelwood and timber harvests to the extent that 65 percent of the RPA goal can be met by the fifth decade. Management intensity is moderate.

Watershed Condition

On-site soil loss decreases seventeen percent between periods one through five. Essentially, all of this reduction occurs in the woodland community where substantial improvement work is being accomplished. Water yield varies from a low 298,904 acre-feet per year in period four to a high of 302,689 acre-feet in period five. Watershed condition improves on 196,691 acres through the first five periods going from 349,425 unsatisfactory acres in period one to 152,734 unsatisfactory acres in period five. This alternative represents the third best action for improvements in watershed condition with a corresponding decrease in soil erosion.

Off-road vehicle closures are increased by 24 percent to protect sensitive soils and vegetation.

Achieves a significant reduction in unsatisfactory watershed condition acres through watershed treatments or management changes.

Outdoor Recreation

All developed recreation sites are managed at standard service level. The private sector provides additional developed recreation site capacity in the early planning periods through expansion of existing lodge facilities and construction of new private sector campgrounds under concession special use permits. Public sector investments are deferred in the early planning periods to reduce Forest Service costs.

Dispersed recreation areas are managed to standard service levels. New dispersed water impoundments, vista point improvements, and hiking trail and trailhead investments offer increased dispersed recreation opportunities.

Wilderness areas are managed to protect and maintain wilderness characteristics. Administration efforts are focused in high use areas and along wilderness boundaries.

Transportation System

Manages transportation system to achieve a fifteen percent reduction in miles of unneeded roads in the first decade, while maintaining facilities at appropriate traffic service levels. Constructs or reconstructs the facilities needed to support the outputs planned. Manages road use to prevent resource damage.

Wildlife Habitat

Improves quality and quantity of diverse wildlife habitats and reverse the decline in old-growth habitat.

Cultural Resources

A minimum of two nominations for each professional archeologist on the Forest are made to the National Register of Historic Places per year. A program of cultural resource survey is initiated on lands not planned for work projects.

Minerals Management

Lands potentially valuable for mineral production are available for exploration and development. Special resource values and uses are protected through oil and gas lease restrictions and seasonal constraints imposed on locatable mineral prospecting and exploration activities. Approximately 5,800 acres of additional locatable mineral withdrawals are recommended to protect special resource values.

Alternative A [No Action]

This is the "no action" alternative. It projects current management direction, emphasis, and budget levels. There is a budget constraint of $7,300,000 per year over the first two decades.

The significant issues are partly a result of current management. Therefore, this alternative does not adequately treat the issues as problems to be solved. Chapter 3, The Affected Environment, describes in detail the situations resulting from current management. The following summarizes highlights of the emphasis under the no action alternative.

Commercial Timber

Timber management practices do not resolve the commercial timber issue. All of the tentatively suitable lands are allocated to timber harvest. Dwarf mistletoe infection levels continue to increase, and health and vigor of timber stands declines because silvicultural prescriptions do not address other insect and disease pests.

Reliable information, useful for long-range planning and operational planning is lacking.

A sustained level of sawtimber outputs to support local industries is provided. The annual allowable sale quantity of sawtimber and roundwood is 82.6 MMBF.

Fuelwood

Preferred fuelwood, such as Gambel oak, aspen, and alligator juniper become less available over time, as a result of a Forest-wide personal-use program. Fuelwood theft and degradation of special habitats, such as oak and pine snags, increase.

In the pinyon-juniper woodland, little emphasis is placed on timber management objectives, wildlife habitat, soil and watershed, or range improvement projects. As a result, age class distribution and habitat diversity improve only slightly over time.

Fuelwood demand is met for the entire planning period. The annual fuelwood harvest of green pinyon-juniper from the woodland is 5.2 MBF. In addition, 7.0 MMBF of conifer residue from timber harvests are available for free-use and personal-use fuelwood programs.

Range Grazing

Grazing capacity would improve slowly, resulting in reductions in permitted use in the first decade to achieve a balance, and only reaching 67 percent of the RPA target by the fifth decade. Management intensity is moderate.

Watershed Condition

On-site soil loss decreases ten percent between periods one through five. Water yield varies from a low of 299,786 acre-feet per year in period four to a high of 302,653 acre-feet per year in period one. Watershed condition improves on 116,836 acres by the fifth period. This alternative represents the next to lowest improvement in watershed condition. Low levels of direct watershed improvement work are scheduled.

Off-road vehicle use is restricted only on currently restricted areas.

Outdoor Recreation

Recreation use reaches developed site capacities at the end of the first planning period. A gradual decline in public sector site capacity results from inadequate facility maintenance and eventual closure of sites failing to meet minimum safety and sanitation standards.

Dispersed recreation areas are managed at the less than standard service level. Available maintenance dollars are invested in the more heavily used trails. Other trails deteriorate and are closed when they become hazardous or present resource problems.

Wilderness values decline from lack of administration in high use areas. Periodic patrols along wilderness boundaries prevent major intrusions of non-conforming uses.

Transportation System

Transportation management would continue to receive emphasis, particularly in timber sale areas. Approximately 200 miles of unneeded road would be obliterated per decade. Road maintenance would be adequate for user safety and resource protection, but not adequate for investment protection.

Wildlife Habitat

Acres of old-growth would decrease slightly over time and eventually be scarcely above minimum management requirements.

Alternative A results in less abundance and distribution of "interspersed habitats." Few improvements are made; the "comprehensive plan" is met at moderate levels.

Cultural Resources

A minimum of two nominations to the National Register of Historic Places by each professional archeologist on the Forest are made each year. The major emphasis

of the cultural resource management program continues to be site identification and protection in advance of ground disturbing projects.

Minerals Management

Oil and gas lease applications and locatable mineral proposals continue to be processed with minimal coordination of other resource emphases. Approximately 700 acres of additional locatable mineral withdrawals are recommended to protect existing developed recreation sites.

Alternative B (RPA)

Alternative B would produce the outputs assigned in the regional guide at the least cost. This alternative could be considered to be more capital intensive rather than land intensive, as compared to the other alternatives. The budget is limited to $8.1 million annually, in the first decade.

Commercial Timber

Approximately 94 percent of the tentatively suitable land base is managed for timber harvest. Growth and LTSYC are less under this alternative than the proposed action, because fewer stands are regenerated in the first decade and less investments are made in cultural treatments. Following intermediate harvests to specified growing stock levels, stands are seeded to improve forage production.

Reliable information is collected from suitable and unsuitable lands that is useful for long-range planning and project planning.

A sustained level of timber outputs to support local dependent industries is provided. The annual allowable sale quantity of sawtimber and roundwood is 73.2 MMBF.

Fuelwood

Commercial and personal-use fuelwood programs are concentrated in the pinyon-juniper woodland. These programs are used to accomplish timber management objectives, wildlife habitat, soil and watershed, and range forage improvement projects. Increased substitution of coniferous residues for the preferred fuelwood sources is encouraged. Fire hazard is reduced.

Reliable information is collected concerning fuelwood resources that is useful for long-range planning and project planning.

Demand for commercial and personal-use fuelwood is met in the first decade. The annual fuelwood harvest of green pinyon-juniper from the woodland is 9.8 MMBF, the highest output of any alternative. In addition, 8.2 MMBF of coniferous residue of timber harvest are available for free and personal-use fuelwood programs.

Range Grazing

There would be an increase in forage, resulting in the highest grazing output of 93 MAUM's annually by the fifth decade or 16 MAUM's greater than current. Grazing capacity and use are balanced in the first period. Alternative B achieves 83 percent of the RPA fifth period goal and has a high management intensity.

Watershed Condition

On-site soil loss decreases 23 percent between periods one through five. Water yield varies from a low of 301,042 acre-feet in period four to a high of 303,996 acre-feet in feet per year in period five. Watershed condition improves by 265,690 acres through the first five decades. This alternative represents the best action in addressing watershed issues and concerns.

Sensitive soils and vegetation are protected through additional off-road vehicle closures which represent a 24 percent increase over current.

Outdoor Recreation

Developed recreation demand is essentially met, and there is a substantial increase in developed site capacity, primarily in the private sector. Developed recreation investments are concentrated in the first three planning periods. Many government-owned campgrounds are operated by the private sector through concession special use permits.

Dispersed recreation is managed at the standard service level. Additional hiking trails, trailheads and water developments provide increased dispersed recreation opportunities.

Wilderness characteristics are maintained through regular scheduled patrols of high use areas and along wilderness boundaries.

Transportation System

Transportation management would be emphasized, particularly in the commercial forests. In non-timbered areas, road maintenance would be adequate to provide user safety but roads would disinvest at the current rate. About 500 miles of road would be obliterated by the third decade.

Wildlife Habitat

Acres of old-growth would continue to increase due to selection of least cost prescriptions, but at one of the lowest rates of all alternatives. "Between stand" diversity and age class distribution would continue to develop at relatively low levels.

Habitat improvement is at a moderate level. The comprehensive plan objectives are met at a moderate level. Habitat diversity is at a moderate level.

Cultural Resources

A minimum of two nominations to the National Register of Historic Places are made by each professional archaeologist on the Forest every year. A program of cultural resource survey is initiated for non-project lands.

Minerals Management

Alternative B relaxes surface occupancy restrictions affecting locatable, leasable and saleable minerals. Approximately 3,500 acres of additional locatable mineral withdrawals are recommended to protect special resource values and uses.

Alternative C

This alternative is designed to emphasize non-commodity outputs, such as dispersed recreation, cultural resource, wildlife, and wilderness recreation, and satisfactory watershed condition. Relatively low outputs of market priced commodities, such as timber and livestock grazing are produced. A budget constraint of $8.1 million annually is used.

Commercial Timber

Approximately 74 percent of the tentatively suitable acres are allocated to timber harvest. Growth and LTSYC under Alternative C are slightly less than the proposed action.

Suitable lands are managed to improve age class distribution, stand health and vigor, and to reduce losses from western spruce budworm, dwarf mistletoe, and other forest pests. Following intermediate harvests to specified growing stock levels, stands are seeded to improve forage production.

Reliable information is collected from unsuitable and suitable lands that is useful for long-range planning and project planning.

A sustained level of timber outputs to support local dependent industries is provided. The annual allowable sale quantity of sawtimber and roundwood is 66.6 MMBF.

Fuelwood

Fuelwood management under this alternative is similar to the proposed action. Projects are concentrated in the pinyon-juniper woodland, and fuelwood harvest is used to accomplish other resource objectives.

Increased substitution of coniferous residues for preferred fuelwood sources is encouraged.

Reliable information concerning fuelwood resources, that is useful for long-range planning and project planning, is collected.

Fuelwood demand is met for the first decade. The annual fuelwood harvest of green pinyon-juniper from the woodland is 7.5 MMBF. In addition, 7.4 MMBF of coniferous residue of timber harvest is available for free and personal-use fuelwood programs.

Range Grazing

Permitted grazing use and capacity would be in balance by the end of the second decade. Grazing capacity would decline in succeeding decades, due to disinvestment of range improvements and a low intensity of management, to the lowest level of all the alternatives, amounting to only 58 percent of the RPA target by the fifth decade.

Watershed Condition

On-site soil loss decreases fifteen percent between period one through five. Water yield varies from a low of 295,202 acre-feet per year in period four to a high of 302,556 acre-feet in period one. Watershed condition improves by 188,480 acres through the first five decades. This alternative adequately addresses watershed issues and concerns, and improves watershed values.

Off-road vehicle use is managed at a higher intensity, resulting in a 24 percent increase of area closures above current.

Outdoor Recreation

Alternative C increases developed recreation capacity through construction of new sites in both the public and private sectors. Most public sector investments are deferred until the latter planning periods. Public sector sites that do not generate user fees are managed at less than standard service level.

Dispersed recreation investments are at a moderate level and popular dispersed camping areas are managed at standard service level.

Wilderness characteristics are enhanced through regular scheduled patrols and increased visitor contacts. Non-conforming uses are eliminated.

Transportation System

A low level of road investment would also result in the least road reconstruction and construction, although maintenance levels would be adequate, resulting in a low level of road disinvestment.

Wildlife Habitat

Alternative C has a level of investment in wildlife habitat improvement almost as high as the proposed action in the first decade amounting to 14,000 acres annually. Although a relatively small acreage of suitable timber is devoted to extended rotations, the larger area of unsuitable acres results in the greatest area qualifying as old-growth by the fifth decade (210,000 acres).

This alternative has the largest increase in diversity of habitats and habitat capability. It provides a high degree of accomplishment for the comprehensive plan.

Cultural Resources

A minimum of two nominations to the National Register of Historic Places are made by each professional archaeologist on the Forest every year. A program of cultural resource survey is initiated for non-project lands.

Minerals Management

Alternative C has the third highest number of surface occupancy restrictions affecting locatable, leasable and saleable minerals. Approximately 5,800 acres of additional locatable mineral withdrawals are recommended to protect special resource values.

Alternative D

Alternative D would intensively manage the Forest for commodities having market value including wood products, livestock forage and developed recreation. Management of other resources would be at economical and environmentally feasible levels consistent with emphasis on market outputs. This emphasis would result in some reduction of amenity outputs where there are resource and, or budget conflicts. There would be a budget constraint in the first decade of $8.1 million per year.

Commercial Timber

Approximately 88 percent of the tentatively suitable acres are managed for timber harvest. Growth and LTSYC are slightly less under this alternative than the proposed action. Suitable lands are managed to improve age class distribution, stand health and vigor, and to reduce losses from western spruce budworm, dwarf mistletoe, and other forest pests.

Following intermediate harvests to specified growing stock levels, stands are seeded to improve forage production.

Reliable information is collected from suitable and unsuitable lands that is useful for long-range planning and project planning.

A sustained level of timber outputs to support local industries is provided. The annual allowable sale quantity of sawtimber and roundwood is 69.7 MMBF.

Fuelwood

Fuelwood management under this alternative is similar to the proposed action. Projects are concentrated in the pinyon-juniper woodland, and fuelwood harvest is used to accomplish other resource objectives.

Increased substitution of coniferous residues for preferred fuelwood species is encouraged.

Reliable information concerning fuelwood resources, that is useful for long-range planning and project planning, is collected.

Fuelwood demand is met for the first decade. The annual fuelwood harvest of green pinyon-juniper from the woodland is 8.9 MMBF. In addition, 7.8 MMBF per year of coniferous residue of timber harvest is available for free and personal-use programs.

Range Grazing

Grazing capacity is the second highest of the alternatives, reaching 81 percent of the RPA goal by the fifth decade. This alternative also represents a high intensity of grazing management and balances grazing use and capacity in the first period.

Watershed Condition

On-site soil loss decreases 22 percent between periods one through five. Water yield varies from a low of 298,685 acre-feet per year in period four to a high of 304,957 acre-feet in period five. Watershed condition improves on 257,143 acres through the first five decades. This action represents the second highest improvement in watershed condition through the fifth period.

Additional off-road vehicle closures represent a two percent increase above current.

Outdoor Recreation

Most public sector sites are managed at standard service level. Several government-owned campgrounds are operated by the private sector under concession special use permits to reduce costs to the government. Increased capacity in the first two planning periods is largely dependent on private sector investments.

Most dispersed recreation areas receive maintenance on a regular basis. No additional dispersed recreation investments are made.

Wilderness characteristics are protected and maintained through patrols of high use areas and along wilderness boundaries.

Transportation System

Alternative D would emphasize a highly developed transportation system to produce market outputs. Local road disinvestment would be reduced to its lowest level in this alternative.

Wildlife Habitat

Acreage assigned to extended timber rotations is almost as high as Alternative C. Due to the higher acreage assigned to the suitable timber category only about half as much acreage meets the old-growth stage of development as in Alternative C by the fifth decade.

This alternative attains only a moderate level of meeting comprehensive plan objectives. Diversity in habitats is maintained at a relatively low level.

Cultural Resources

A minimum of two nominations to the National Register of Historic Places by each professional archaeologist on the Forest are made every year. A program of cultural resource survey of non-project lands is initiated.

Minerals Management

Alternative D is the least restrictive alternative in terms of surface occupancy constraints that effect locatable, leasable and saleable minerals. Approximately 3,350 acres of additional locatable mineral withdrawals are recommended to protect special resource values and uses.

Alternative E

This alternative is based on an analysis of a maximum PNV using assigned values, and a budget constraint of $8.1 million annually for the first decade. The emphasis on prudent economic investment results in high outputs of revenue producing outputs, such as timber. Investments with low rates of return, such as grazing and higher cost amenity outputs, such as dispersed recreation are produced at relatively low levels. Management of all outputs is at environmentally feasible levels consistent with the emphasis on high rates of return on investment.

Commercial Timber

Approximately 99 percent of the tentatively suitable land base is managed for timber harvest. Growth and LTSYC are higher under this alternative than the proposed action, because more acres are regenerated in the first decade, and more investments are made in cultural treatments. Suitable lands are managed to improve age class distribution, stand health and vigor, and reduce losses from western spruce budworm, dwarf mistletoe, and other forest pests. Following intermediate entries to specified growing stock levels, stands are seeded to improve forage production.

Reliable information is collected from unsuitable and suitable lands that is useful for long-range planning and project planning.

A sustained level of timber outputs to support local dependent industries is provided. The annual allowable sale quantity of sawtimber and roundwood is 99.8 MMBF.

Fuelwood

Fuelwood projects are concentrated in the pinyon-juniper woodland, and fuelwood harvest is used as the tool to accomplish other resource objectives, however fewer acres are treated under this alternative than the proposed action.

Increased substitution of coniferous residue for preferred fuelwood sources is encouraged.

Reliable information concerning fuelwood resources, that is useful for long-range planning and project planning, is collected.

Fuelwood demand is met for the entire planning horizon. The annual fuelwood harvest of green pinyon-juniper from the woodland is 5.1 MMBF. In addition, 11.2 MMBF per year of coniferous residue of timber harvest is available for free and personal-use fuelwood programs.

Range Grazing

Permitted grazing use and capacity will be balanced in the second decade. Grazing capacity drops below current level to 69.3 MAUM's annually in the first period as a result of low levels of investment in range improvements, and a low intensity of management. Alternative E achieves sixty percent of the fifth period RPA goal.

Watershed Condition

On-site soil loss decreases ten percent between periods one through five. Water yield varies from 302,496 acre-feet in period one to 310,873 acre-feet in period five. Watershed condition improves on 109,403 acres through the first five decades. The action represents the worst alternative in regards to improvements in watershed values.

Off-road vehicle closures are increased by 24 percent above current to protect sensitive soils and vegetation.

Outdoor Recreation

Numerous developed recreation investments in both the public and private sectors results in meeting almost all of the estimated demand by the fifth planning period. Most government-owned campgrounds are operated by the private sector through concession special use permits.

Many popular dispersed camping areas are managed at less than standard service levels. New dispersed investments offer increased hiking, fishing and scenic opportunities.

Wilderness patrols in high use areas and along wilderness boundaries serve to protect and maintain wilderness characteristics.

Transportation System

Road investment and density is highest in this alternative. There is also a higher investment in road maintenance activity in order to prevent degradation of the road network.

Wildlife Habitat

This alternative assigns the lowest level of suitable timber acres to extended rotations. As a result this alternative also achieves the lowest old-growth stage acreage of 15,000 acres by the fifth decade, a reduction of 85 percent from current estimated acres.

This alternative achieves a very low level of habitat diversity. The level of meeting comprehensive plan objectives is low.

Cultural Resources

A minimum of two nominations to the National Register of Historic Places are made by each professional archaeologist on the Forest every year. A program of cultural resource survey of non-project lands is initiated.

Minerals Management

Alternative E proposes the greatest number of additional locatable mineral withdrawals to protect special resource values and uses. New site withdrawals total approximately 7,900 acres. Alternative E is also the most restrictive alternative in terms of special surface use stipulations for oil and gas leases and seasonal constraints for locatable mineral prospecting and exploration activities.

COMPARISON OF ALTERNATIVES

The following sections show how each alternative addresses the issues, concerns, and opportunities. There are quantity and quality aspects of each issue. Those quantities associated with the issue are listed in tables to provide some understanding of the effects. The qualitative aspects are dealt with in narrative form. Some of these evaluations are subjective and are based on the professional judgement of the ID Team members.

Issue 1- Commercial Timber

The alternatives effect the timber resource by the intensities of silviculture applied and the acreage managed for timber production. The effects are characterized, primarily, by differences in the acres of suitable timberlands, age class distribution, growth and long-term sustained yield, allowable sale quantities, acres of regeneration harvest, health and vigor of the stands, and acres allocated to extended rotations.

Using the criteria for determining tentatively suitable timber acres, 492,436 acres are classified as tentatively suitable for timber production. The alternatives use different proportions of the tentatively suitable acreage to achieve outputs, goals, and objectives unique to each alternative.

Alternatives A and E allocate 100 percent and 99 percent of the tentatively suitable acres to timber harvest. Alternatives PA, B, C, and D allocate fewer acres to timber harvest, to resolve other resource issues and concerns, primarily wildlife and range. In Alternatives PA, B, C, D, the allocations represent 90, 84, 74 and 88 percent of the total tentatively suitable acreage, respectively.

Each alternative results in a different age class distribution by the twentieth decade. Equal distribution of age classes provides higher and more regular sustained yields, more variety and diversity of habitats, and a higher level of health and vigor in the Forest. The age class distribution, by alternative, for the entire forest is displayed in Chapter 4.

Uniform distribution of age classes is not achieved in the next 200 years in any alternative. Alternative PA displays the best distribution of age classes. Progress is made toward the goal in all alternatives.

Long-Term Sustained Yield Capacity [LTSYC] is a measure of the long-term timber productivity resulting from the management emphasis inherent in each alternative. It is the highest average yield from suitable lands consistent with multiple use objectives of each alternative and a specified management intensity. LTSYC is based on the assumption that the Forest is in a fully managed condition. It is a function of the amount and productivity of suitable acres, and the management intensity of prescriptions assigned and scheduled for an alternative. The maximum annual LTSYC for the Forest is 25.1 MMCF.

All alternatives illustrate compromises made in silviculture and timber management. Growth in each alternative varies from sixty percent to eighty percent of LTSYC, in order to better resolve other forest resource issues, primarily wildlife and range.

Alternative E best resolves the commercial timber issue because the highest growth rates for the acres allocated to harvest are realized in the shortest time.

Alternative B provides the poorest resolution of this component of the commercial timber issue, as growth rates are only fifty percent of LTSYC.

Table 2. Summary of Commercial Timber Management Characteristics by Alternative

Characteristic	Alternative PA	A	B	C	D	E
Suitable Timber Land (M ACRES)	439.9	492.4	461.2	362.6	430.2	488.0
Annual Growth (MMCF)	15.1	15.7	10.8	12.1	13.1	18.7
Annual LTSYC (MMCF) 1/	20.7	25.1	21.5	17.6	19.8	23.5
Annual Allowable Sale Quantity (ASQ) (MMCF) Decade 1 2/	14.5	12.1	14.5	13.1	13.7	19.5
Average Annual Volume (MMBF) Decade 1	73.3	62.8	73.2	66.6	69.7	99.8
Health and Vigor Ranking 3/	4	3	2	6	5	1
Extended Rotation (M ACRES) 4/	65,600	14,700	29,800	68,500	44,100	14,700

1/ LTSYC is a measure of the long-term productivity.

2/ Sawtimber and products are included. The ASQ represents a maximum production ceiling. Actual harvest levels may be less than ASQ.

3/ A ranking of 1 represents the best stand health and vigor; a ranking of 6, the poorest.

4/ These acres are allocated to extended rotation to supplement existing old-growth.

The current average annual allowable sale quantity (ASQ) for the Forest is 64 MMBF (12.8 MMCF). The ten-year average (1975-1984) for sawtimber and product volume sold has been 63.8 MMBF per year.

Under Alternative A the ASQ is reduced slightly below current levels. Under Alternatives PA, B, C, D, and E the ASQ is increased above current levels. The range of increase varies from four percent under Alternative C to 56 percent under Alternative E.

Health and vigor of timber stands is affected primarily by acres allocated to timber harvest, and the timber management intensity applied to those acres. Growth rate and susceptibility to insects and diseases are measures of stand health and vigor.

Alternative E best addresses the issue of stand health and vigor. Approximately 99 percent of the tentatively suitable acres are allocated to timber harvest, fewer acres are allocated to extended rotations, and more stands are treated with intermediate and regeneration harvests than other alternatives.

In descending order of resolution of this component of the commercial timber issue, the alternatives are E, B, A, PA, D and C.

In most areas of the Forest, there is adequate old-growth to maintain viable wildlife populations. Some areas on the south side of the Kaibab, however, are deficient in old-growth characteristic habitat. Total acres and distribution of this important habitat are increased as additional acres are allocated to extended rotations, and integrated stand management is applied more extensively.

Additional acres allocated to extended rotations supplement existing acres of old-growth. Alternative C allocates the greatest percentage of suitable acres to extended rotations, fourteen percent. Alternatives PA, B, and D allocate thirteen percent, six percent, nine percent respectively. Alternatives A and E each allocate three percent to extended rotations.

Each alternative addresses differently the criteria discussed previously for the resolution of the commercial timber issue. The following table summarizes this previous analysis into a ranking of how well each alternative resolves the overall commercial timber issue.

Table 3. Ranking of Timber Issue Resolution by Alternative

Alternatives					
PA	A	B	C	D	E
2	6	4	5	3	1

A ranking of "1" best resolves the issue.

Issue 2- Fuelwood

The Forest has adequate supplies of total wood fiber to supply current and projected demand for fuelwood. The important portion of the issue is centered on the Forest's ability to provide adequate green pinyon-juniper (PJ) fuelwood, currently the preferred commercial species.

Under all alternatives the primary fuelwood sources are green pinyon and juniper (PJ), and coniferous residues from commercial harvests. Fuelwood is harvested from acres allocated to soil and watershed, and wildlife habitat improvement projects, and timber management overstory removals. Secondary quantities of Gambel oak and aspen are harvested from acres allocated to wildlife habitat improvement projects, only.

The projected demand for green fuelwood is 11 MMBF, annually, through planning period one. By period 5, the projected use for green fuelwood is 13.5 MMBF, annually.

The Forest has adequate productive capability to meet overall demand for personal and commercial use fuelwood for the first decade. To satisfy this demand it is necessary to supplement green PJ with coniferous residues. The alternatives provide for a different mix of green PJ and coniferous residues to meet this total demand.

All alternatives provide additional coniferous residues beyond that needed to meet estimated future demand in the first decade. This additional volume is available if demand for fuelwood increases more rapidly than expected.

All alternatives except A provide for the collection of more complete information from silvicultural examination and forest inventory, that is useful for planning purposes. All alternatives provide for increased substitution of coniferous residues for preferred fuelwood sources, and as a result reduce wildfire fuel loading below current levels. Therefore these criteria do not provide a meaningful basis for comparison of alternative issue resolution.

Table 4. Summary of Average Annual Fuelwood Outputs by Alternative in Planning Period 1

Output	Alternative PA	A	B	C	D	E
Total Fuelwood Output (MMBF)	17.0	12.2	18.0	14.9	16.7	16.3
Pinyon-Juniper (PJ) Fuelwood Output (MMBF)	8.8	5.2	9.8	7.5	8.9	5.1
PJ Percent of Total Fuelwood Output 1/	52	43	54	50	53	31
PJ Percent of Total Projected Use 2/	79	47	88	68	80	46

1/ This display represents the percentage of green PJ fuelwood produced of the total fuelwood produced in the first decade.

2/ This display represents the percentage of green PJ fuelwood produced of the total projected use in the first decade.

The alternative that provides the greatest amount of the preferred green fuelwood species, pinyon and juniper, best resolves the fuelwood issue. In descending order of resolution of the fuelwood issue for the total forest, the alternatives are B, D, PA, C, A, and E.

Table 5. Ranking of Fuelwood Issue Resolution by Alternative

	PA	A	B	C	D	E
Ranking	3	5	1	4	2	6

A ranking of 1 best resolves the issue.

Issue 3-Range

The current estimated grazing capacity on the Forest is 71,000 animal unit months (AUM's). Permitted use in 1985 was 88,990 AUM's with 62,760 AUM's actually grazed.

Alternative B has very intensive range management strategies employed. Capital investments provide for adequate replacement of existing structural and non-structural improvements along with a high level of new project development. Range capacity increases thirteen percent from the current level of 71,000 AUM's. Capacity and permitted AUM's balance in Period 1.

Alternatives D, PA, and A use moderately intensive range management strategies that also balance capacity and permitted AUM's in Period 1. Capital investments provide for adequate replacement of existing structural and non-structural improvements. Some investment is made in new project development to maintain existing capacity and improve livestock distribution. Some impacts to local permittees will occur. When the impacts are related to current actual grazing numbers , the resultant capacities in these alternatives show the permittee impact to be small.

Alternatives C and E employ extensive range management strategies. Livestock reduction is the primary method used to balance permitted and capacity AUM's in Period 2. Existing range investments would be lost and no new investments planned.

Capacity declines three to ten percent by the end of Period 2. Significant impacts to the range permittees would result as livestock reductions are implemented.

Table 6. Summary of Range Management Characteristics by Alternative

Characteristic	Alternatives PA	A	B	C	D	E
Management Intensity 1/	3	4	1	5	2	6
Capital Investment 2/	M	M	H	L	MH	L
Period of Balance 3/	1	1	1	2	1	2
Capacity at Balance (M AUM's)	73	73	80	65	77	69

1/ "1" equals most intensive, "6" equals most extensive.

2/ "H" equals all existing investments replaced, high levels of new project investment.
"MH" equals all existing investments replaced, moderately high levels of new project investment.
"M" equals majority of existing investments replaced, low levels of new project investment.
"L" equals majority of existing investments not replaced, no new project investment.

3/ Period of balance means the period when permitted use equals Forest grazing capacity. When balance occurs by the end of the period, the average annual outputs shown in Table 28 will appear to be out of balance.

Table 7. Ranking of Range Issue Resolution by Alternative

	Alternatives PA	A	B	C	D	E
Ranking	1	1	2	4	1	3

Alternatives with the same ranking resolve the issue equally well. A ranking of 1 is the best.

Resolution of the range issue can be described from two points of view. The first point of view centers around bringing permitted use in balance with the actual capacity of the resource. The second point of view is that reductions in permitted use will have adverse impacts to permittees with long standing permits. The alternatives that best resolve the issue balance actions appropriate with both points of view, while minimizing management costs.

Issue 4-Watershed Condition

This issue relates to the requirement not to impair soil productivity. The two most readily measureable factors that describe long-term effects on soil productivity are soil loss and acreage in unsatisfactory watershed condition. Table 8 compares these factors by alternative.

Improvements in watershed condition will occur in all alternatives as a result of direct treatments and, or balancing permitted livestock use with Forest capacity. However, only under Alternatives PA, B, C and D will enough soil and water improvement be done to change condition classes on all watersheds.

Alternatives A and E will show gradual improvement, but the improvement will not be sufficient to change condition classes on all watersheds.

Soil loss, like watershed condition, exhibits rates lower than are presently occurring. The highest decreases occur under Alternatives PA, B, C and D with the lowest decreases in Alternatives A and E. Soil losses diminish by increasing ground cover through direct project work and improved range management.

Table 8. Percent Reduction from Current Average Soil Loss and Unsatisfactory Watershed Condition Acreage in Period 5

	Alternatives					
	PA	A	B	C	D	E
Soil Loss	-17	-10	-23	-15	-22	-10
Unsatisfactory Watershed Condition	-56	-33	-76	-49	-74	-32

Alternatives that improve watershed condition the quickest and reduce on-site soil loss the most, resolve this issue the best.

Table 9. Ranking of Watershed Condition Issue Resolution by Alternative

	Alternatives					
	PA	A	B	C	D	E
Ranking	3	5	1	4	2	6

Alternatives with the same ranking resolve the issue equally well, a ranking of 1 is the best.

Issue 5-Developed Recreation

Developed recreation issues and concerns deal with maintenance levels of existing sites and opportunities for providing additional developed recreation capacity. The alternatives provide for different combinations of management intensity for existing sites and various mixes of new public and private sector recreation investments to address these issues and concerns.

Alternatives PA and C essentially maintain the current mix of public and private sector capacity and output reflected under Alternative A. Unlike Alternative A, however, both of these alternatives shift the preponderance of capacity and use in the latter planning periods to the private sector. Alternatives B, D and E result in a drematic change from the current even mix of capacity and output through the conversion of public sector campgrounds to concession operation, and emphasis on expansion of private sector sites and new private sector recreation investments.

All alternatives except Alternative A rely heavily on the private sector to provide the additional capacity needed to satisfy projected developed recreation demand. Private sector investments are greatest in the first few planning periods under Alternatives PA, A and E. Alternative C postpones the construction of several private sector sites until the fifth decade. New public sector sites are scheduled in the early planning periods under Alternatives B, C, D and E.

Public sector investments are deferred in Alternative PA to the latter planning periods to reduce Forest Service construction and maintenance costs.

Table 10. Summary of Developed Recreation Management Characteristics by Alternative

Characteristics		PA	A	Alternatives B	C	D	E
Total Annual Developed Use (MRVD)	Decade 1	590	537	595	585	590	595
	Decade 5	984	548	1115	1022	1020	1110
Percent of Estimated Demand Satisfied	Decade 1	99	90	100	98	99	100
	Decade 5	66	37	75	68	68	74
Total Additional Site Capacity All Decades (PAOT)*		3600	0	3960	3960	3885	3960
Total Average Annual Developed Recreation Budget (M$)	Period 1	268	224	179	280	220	141
	Period 5	330	224	248	365	282	210

* Excludes the 2000 PAOT's which would result from the construction of the Bill Williams ski area.

Alternatives PA, B, D and E operate and maintain all public sector sites to standard service level. To accomplish this, however, Alternatives B, D and E convert several public sector fee sites to concession operation. Alternatives PA and C are the only alternatives that provide for Forest Service operation and maintenance of all public sector sites.

Alternatives A and C maintain some sites to less than standard service level. This may ultimately result in the closure of certain facilities and sites if conditions fall below minimum health and safety standards. Under Alternative A, several public sector fee sites, campgrounds where overnite use fees are charged, are managed at less than standard service level. Public sector recreation fee sites are one of several major revenue producers for the Forest Service. Less than standard management of public sector fee sites may eventually lead to the deterioration of these sites below standards which qualify them for fee collections. Under Alternative C, visitor information centers, snow play areas and scenic overlooks are managed at less than standard service level. Even though these facilities are non-revenue producers, they are essential to provide a wide spectrum of developed recreation opportunities.

The developed recreation issue primarily addresses the Forest's ability to provide adequate amounts and kinds of recreation with high user satisfaction. Alternatives that provide additional recreation capacity, manage developed sites in an efficient manner and retain developed sites in the public sector best resolve this issue.

Table 11. Ranking of Developed Recreation Issue Resolution By Alternative

	PA	A	Alternatives B	C	D	E
Ranking	1	4	3	2	2	3

Alternatives with the same ranking resolve the issue equally well. A ranking of 1 is the best.

Issue 6–Downhill Skiing

Significant public interest exists for the development of alpine skiing facilities. An opportunity for a ski area exists on Bill Williams Mountain. Capture of this opportunity may impact wildlife habitats, visual resources, watershed condition, and the yield of other resource outputs.

A separate EIS has been prepared to discuss opportunities and impacts of new ski area development. A final decision has not been made on that land allocation. The supporting analysis and decision when rendered will be incorporated in this document and become a part of each alternative. Therefore, the issue resolution of each alternative can be considered equal.

Table 12. Ranking of Alpine Skiing Issue Resolution by Alternative

	Alternatives					
	PA	A	B	C	D	E
Ranking	1	1	1	1	1	1

Alternatives with the same ranking resolve the issue equally well. A ranking of 1 is the best.

Issue 7–Dispersed Recreation

The dispersed recreation issue revolves around providing a wide array of recreation opportunities at management levels that provide for high user satisfaction.

Dispersed recreation opportunities are a function of the Recreation Opportunity Spectrum (ROS) composition of the Forest, maintenance frequency of popular dispersed areas and the number and type of dispersed recreation facilities offered under the alternatives. The ROS composition remains constant in all alternatives, but the level of management and proposed dispersed investments do vary by alternative.

Although projected outputs are similar for all alternatives, they are influenced by certain management practices under several alternatives. Reduced outputs under Alternatives A, D and E are a result of fewer dispersed investments or decreased levels of road maintenance in the roaded natural ROS setting.

Alternatives PA, B and C manage the entire Forest at standard service level. Under these alternatives, and to some extent Alternatives D and E, inspection and maintenance of facilities and popular dispersed camping areas is performed on a regular scheduled basis. News releases, interpretive signing and other information services are provided at increased levels. Alternatives A, D and E provide for less than standard management of all or portions of the Forest. Maintenance of popular dispersed camping areas and facilities occurs at minimum levels under these alternatives and user satisfaction may be less. Accumulated evidence of use may detract from the natural setting of popular dispersed areas. Area and facility closures may be necessary to prevent resource damage.

Dispersed recreation investments are proposed under Alternatives PA, B, C and E. Dispersed investment opportunities are highest under Alternative PA and lowest under Alternative C. Alternatives PA, B and E provide for similar opportunities in planning period 1. Fewer dispersed investments are schedule in the second planning period in all of the alternatives.

Table 32 [cont]. Average Annual Benefits-Thousand Jan. 1, 1982 Dollars

Resource Activity		Alternatives PA	A	B	C	D	E	Benchmarks Min Level	Max PNV Assigned	Max Timber	Max Range
Public Sector Developed Rec Use-LSTD											
Decade	1	0	1092	0	0	0	0	0	0	0	0
	2	0	1102	0	0	0	0	0	0	0	0
	3	0	1548	0	0	0	0	0	0	0	0
	4	0	1548	0	0	0	0	0	0	0	0
	5	0	1548	0	0	0	0	0	0	0	0
Private Sector Developed Rec											
Decade	1	2614	2611	2555	2225	3541	5049	0	4555	4555	4555
	2	3873	2244	5899	3200	4820	6458	0	5899	5899	5899
	3	5227	2253	7130	4015	6174	7661	0	7130	7130	7130
	4	5360	2253	7992	4147	6316	7670	0	7922	7992	7992
	5	5360	2253	7992	5369	6316	7679	0	7992	7992	7992
Dispersed Rec Use -STD											
Decade	1	2982	0	2971	2983	2065	2504	0	2731	2963	2283
	2	3415	0	3384	3383	2320	2856	0	3098	3366	2634
	3	3804	0	3775	3759	2576	3185	0	3451	3751	2961
	4	4172	0	4138	4122	2823	3495	0	3784	4114	3249
Dispersed Rec Use-LSTD											
Decade	1	0	1445	6	0	357	118	764	63	8	273
	2	0	1691	6	0	402	133	764	72	9	307
	3	3	1796	7	3	446	150	764	82	10	342
	4	4	1971	7	3	489	165	764	89	11	377
	5	4	2149	8	3	532	180	764	97	12	410
Dispersed Highway Rec Use											
Decade	1	3820	3820	3820	3820	3820	3820	3820	3820	3820	3820
	2	3820	3820	3820	3820	3820	3820	3820	3820	3820	3820
	3	3820	3820	3820	3820	3820	3820	3820	3820	3820	3820
	4	3820	3820	3820	3820	3820	3820	3820	3820	3820	3820
	5	3820	3820	3820	3820	3820	3820	3820	3820	3820	3820
Wilderness Use-STD											
Decade	1	96	0	96	96	96	96	0	96	14	96
	2	110	0	110	110	110	110	0	110	28	110
	3	124	0	124	124	124	124	0	124	28	124
	4	138	0	138	138	138	138	0	138	28	138
	5	151	0	151	151	151	151	0	151	28	151
Wilderness Use-LSTD											
Decade	1	0	22	0	0	0	0	12	0	15	0
	2	0	29	0	0	0	0	22	0	22	0
	3	0	29	0	0	0	0	22	0	22	0
	4	0	36	0	0	0	0	22	0	22	0
	5	0	36	0	0	0	0	29	0	29	0
Wildlife Rec Use											
Decade	1	4887	4725	4698	5130	4725	4860	4644	4806	4725	4725
	2	4833	4671	4725	4995	4725	4860	4617	4806	4671	4779
	3	4806	4644	4752	4887	4725	4833	4563	4806	4644	4806
	4	4752	4590	4725	4752	4725	4833	4536	4806	4590	4860
	5	4725	4563	4779	4644	4725	4833	4482	4806	4563	4914
Grazing Capacity											
Decade	1	724	734	765	651	734	713	0	734	734	776
	2	755	755	827	672	796	713	0	745	755	838
	3	755	776	889	672	889	713	0	755	786	920
	4	755	776	920	672	900	703	0	744	786	951
	5	755	776	962	672	941	693	0	744	786	1003

Table 32 [cont]. Average Annual Benefits-Thousand Jan. 1, 1982 Dollars

Resource Activity		Alternatives PA	A	B	C	D	E	Benchmarks Min Level	Max PNV Assigned	Max Timber	Max Range
Sawtimber											
Decade	1	7067	6501	6861	6419	6825	9954	0	11205	11424	17524
	2	8523	7503	8138	7444	8855	12156	0	12061	11977	16793
	3	7679	11314	8558	7106	9643	9816	0	10012	11181	11362
	4	6931	9933	8697	7120	8952	10315	0	10271	10205	8793
	5	7806	10417	8376	6815	8380	9369	0	9328	10528	6712
All Pinyon-juniper Fuelwood											
Decade	1	70	39	80	62	70	39	0	39	47	116
	2	70	39	80	62	70	39	0	39	47	116
	3	70	39	80	62	70	39	0	39	47	116
	4	80	39	80	62	70	39	0	39	54	116
	5	80	39	80	62	70	39	0	39	54	116
Water Yield											
Decade	1	13137	13181	13181	13181	13181	13137	12789	13181	13181	13181
	2	13094	13094	13181	13050	13094	13181	12397	13137	13137	13529
	3	13050	13094	13181	12963	13050	13268	12136	13398	13268	13790
	4	13007	13050	13094	12833	13007	13268	11875	13398	13442	13877
	5	13181	13137	13224	12833	13268	13529	11658	13442	13485	13964
Wild Burro Use											
Decade	1	5	5	5	5	5	5	5	5	5	5
	2	5	5	5	5	5	5	5	5	5	5
	3	5	5	5	5	5	5	5	5	5	5
	4	5	5	5	5	5	5	5	5	5	5
	5	5	5	5	5	5	5	5	5	5	5
Total Receipts (MDollars)											
Decade	1	7664	6996	7353	7018	7333	10346	0	11644	11874	18094
	2	9271	8056	8805	8171	9492	12696	0	12663	12504	17489
	3	8466	11706	9360	7839	10386	10518	0	10772	11906	12199
	4	7816	10328	9552	7856	9696	11024	0	11058	11021	9697
	5	8676	10799	9237	7679	9129	10075	0	10105	11332	7621
Distribution to Counties (MDollars)											
Decade	1	1916	1749	1838	1755	1833	2587	0	2911	2969	4524
	2	2318	2014	2201	2043	2373	3174	0	3166	3126	4372
	3	2117	2927	2340	1960	2597	2630	0	2693	2977	3050
	4	1654	2582	2388	1964	2424	2756	0	2765	2755	2424
	5	2169	2700	2309	1920	2282	2519	0	2526	2833	1905

Federal government receipts attributable to Forest activities in Table 32 are for timber, range, and developed recreation. Receipts are not collected for water, dispersed recreation, wilderness or wildlife. Mineral royalties and lease payments are administered by the Bureau of Land Management (BLM). Government receipts for grazing and recreation are considerably less than the benefit values used in FORPLAN. This is because of the difference between "willingness to pay" (benefit values) and actual payments (receipts). Timber receipts are slightly less than timber benefits because dead and down fuelwood actual receipts are less than modeled benefits. Range receipts, $2.00 per animal-month (AM) (1985 fee), are considerably less than modeled benefit values. Recreation values reflect actual receipts based on specific levels of management.

Each year the Forest Service returns 25 percent of the gross revenue to the states for disbursements to counties based on the percentage of the national forest acreage in the county. The counties within the Kaibab National Forest area of influence include Coconino, Yavapai, and Mohave.

Changes in market prices and willingness to purchase by the private sector can cause widely fluctuating revenues.

Due to the high timber outputs, decade 1 local government receipts would be greatest in Alternative E, followed by Alternatives PA, B, D, and C. For the total of decades one through five, receipts are greatest in Alternatives E and A. Generally, increased receipts and taxes force higher maintenance costs. In Alternative E, receipts are greatest, but probably so are government costs from greater forest user demands, road wear, increasing population requirements for expanded government services as schools and sanitation, and more maintenance for existing facilities. The inverse situation holds for decreasing government receipts and taxes.

Counties also receive payments in lieu of taxes. This program is administered by the Department of Interior, BLM. The program is dependent on annual congressional appropriations rather than forest receipts, and therefore, the payment program is not included in the analysis.

Present Net Value Analysis

Present net value (PNV) of priced benefits was the method used to solve the optimization problem modeled in the benchmarks and alternatives. The priced outputs are those that are or can be exchanged in the marketplace or for which "willingness to pay" values have been assigned. These include wildlife, wilderness, developed and dispersed use, permitted livestock use, timber products and fuelwood, minerals and water yield.

The alternatives are designed and analyzed to achieve goals and objectives for priced outputs in a manner that achieves the greatest excess in the value of priced outputs in relation to cost of production while meeting all specified constraints and objectives. The alternatives are also designed to achieve any specified non-priced outputs or benefits and to meet constraints at least cost. The PNV of each alternative, therefore, estimates the value of the maximum attainable net benefits of priced outputs the market value of resources after all costs of producing outputs and meeting constraints have been subtracted from the value of the expected flow of priced outputs.

The following table displays the alternatives arranged in order of decreasing present net value of benefits (PVB). The intent is to display what happens to PNV as PVB decreases marginally from one alternative to the next. It is important to note the alternatives were not developed in order of decreasing costs but are displayed in this fashion to provide a comparative analysis.

Table 33. Value Analysis by Alternative-Millions Jan. 1, 1982 Dollars

		Alternative					
	PNV	E	B	PA	D	C	A
PVB	1144.3	1128.0	1076.8	1047.9	1054.1	1020.7	939.2
CHANGE Betw. Alt.		-16.3	-51.2	-28.9	+6.2	-33.4	-81.5
PVC	242.2	231.3	236.1	226.5	236.4	216.7	218.1
CHANGE Betw. Alt.		-10.9	+4.8	-9.6	+9.9	-19.7	+1.4
PNV	902.1	896.7	840.7	821.4	817.7	804.0	721.1
CHANGE Betw. Alt.		-5.4	-56.0	-19.3	-3.7	-13.7	-82.9
B/C	4.72	4.88	4.56	4.63	4.46	4.71	4.31

	Alternative						
PVB by Resource Category	PNV	E	B	PA	D	C	A
Developed Recreation	206.8	206.3	206.8	187.9	195.4	181.4	107.7
Dispersed Recreation	182.7	177.6	188.5	189.1	170.6	188.2	140.7
Wilderness	2.9	2.9	2.9	3.1	2.9	2.9	.8
Wildlife	121.7	122.7	119.8	121.9	119.6	124.7	117.7
Range	18.9	18.1	21.7	18.9	21.2	17.0	19.3
Sawtimber/Products	272.0	261.8	200.1	192.9	208.4	174.8	217.7
Fuelwood	1.0	1.0	2.0	1.8	1.8	1.6	1.0
Water Yield	338.3	337.6	335.0	332.2	334.2	330.1	334.3

Table 33, [cont.] Value Analysis by Alternative-Millions Jan, 1, 1982 Dollars

PVC by Major Budget Cost Category	PNV	E	B	PA	D	C	A
			Alternative				
Developed Recreation	16.0	15.9	16.0	15.2	15.7	15.8	6.8
Dispersed Recreation	4.2	4.1	4.7	4.9	4.0	4.7	3.8
Wilderness	.3	.3	.3	.3	.3	.7	.1
Wildlife	8.0	7.5	7.5	12.1	7.1	9.6	2.5
Range	11.4	10.1	16.6	11.9	16.5	10.7	11.8
Sawtimber/Products	99.4	95.6	76.7	72.8	79.0	86.7	89.1
Fuelwood	.1	.1	.5	.1	.5	.1	.5
Soil/Water	4.0	3.5	4.1	4.1	3.8	5.0	3.1
Fire	46.5	45.8	49.0	47.2	50.4	46.6	44.8
Roads/FAO	22.6	20.1	28.2	25.9	26.3	25.4	24.7
Other	29.7	28.3	32.5	32.0	32.8	31.4	31.1

Present values for resource benefits (PVB) and associated discounted costs (PVC) are shown in Table 33 above. Benefit values for timber include market values (revenues) for sawtimber and products. Fuelwood is displayed as a separate category and includes accessible fuelwood. Recreation benefits include separate categories for developed recreation and dispersed recreation, wildlife and fish user days, and wilderness recreation. Range values consist of the total value of all permitted AUM's. The water yield benefit is based on the assigned value of an acre-foot of water. Only the incremental increase or decrease in water yield from the existing level is valued.

The present value for timber costs (PVC) include funds necessary to administer the timber program on the forest. The individual cost items tracked in FORPLAN are shown in Appendix B. The costs for recreation and wildlife, range, protection, roads and facilities, and all other costs are costs necessary to administer the respective programs. All benefits and costs identified are those that appear in the FORPLAN model.

In general, decreasing budget costs result in decreased benefits and PNV. The relative magnitude varies depending on whether commodity or amenity outputs are being emphasized.

It must be remembered that dispersed recreation, wilderness, and wildlife benefits do not result in actual returns to the U. S. Treasury. As a result, receipts to the U. S. Treasury and payments to counties in lieu of taxes are significantly higher for the commodity emphasis alternatives. The effect on PNV from one alternative to the next in the table above fluctuates as per the discussion for benefits - the PNV is generally higher for the non-commodity emphasis alternatives than for the commodity emphasis alternatives. The primary determinant of the magnitude of benefits in each alternative is the level of dispersed and developed recreation and the timber harvest level. The benefit/cost ratio is highest for Alternative E due to a strong mix of these resources.

Non-priced Benefits

Non-priced benefits include on-site outputs or effects. Non-priced benefits are those benefits for which no monetary value or price can be determined. Examples can include: impacts on local employment, cultural resources, visual quality, watershed condition, threatened and endangered species, reduction in soil loss, riparian area rehabilitation, fire protection/suppression, and right-of-way acquisition, public health and safety, road obliteration, and old-growth habitat.

Non-priced benefits do not significantly affect priced benefits in any of the alternatives. The majority of the changes to costs in the alternatives can be tied directly to priced benefits. This, however, does not suggest that priced benefits do not significantly affect non-priced benefits or that non-priced benefits are not an important aspect of the decision making process of the Kaibab planning effort. A discussion of non-priced benefits is necessary because of their contribution to net public benefits, however, there is a difficulty in comparing trade-offs. A determination as to whether a reduction in soil loss is worth more than an increase in timber harvest becomes a judgement based on values and priorities. Present net value does not always decrease as non-priced benefits increase since non-priced benefits are often closely tied to the priced benefits as complementary. On the other hand, soil loss is directly related to road construction and timber harvest yet it has a negative benefit. Large amounts of soil loss can reduce the productivity of a site to produce vegetation which can result in secondary impacts.

There is likely a trade-off relationship between soil loss and PNV. The benefit of reducing soil loss is related to the opportunity cost of reducing the volume of timber harvested.

In analyzing the trade-offs among alternatives, it is necessary to consider the entire array of non-priced benefits; the relationships between priced and non-priced benefit output levels; and the qualitative values associated with non-priced benefits as they relate to the quantitative measure of economic efficiency represented by PNV. The judgmental comparisons of alternatives performed within this framework form the principal indicator of the net public benefit associated with each alternative.

Non-priced benefits which are complementary to priced benefits include desirable distributive effects. These decrease as the priced benefits decline. The most significant measure of non-priced distributive benefits is the level of local employment associated with each alternative. The IMPLAN model will be used to evaluate the distributive effects by alternative. Results will be displayed in chapter 4 under economic and social consideration.

Present Net Value Trade-Offs

Table 34 displays the ranking of the alternatives against the Max PNV Assigned Value benchmark. The alternatives are ranked in order of decreasing PNV from left to right. The comparisons are in millions of dollars [January 1, 1982 value] discounted at four percent. The difference in PNV between alternatives is called the trade-off or opportunity cost, which is the investment opportunity foregone by implementing the alternative instead of the maximum PNV benchmark. The following discussion highlights the major opportunity costs of each alternative when compared to the alternative with the next highest PNV.

Table 34. Comparison of Alternatives with Max PNV Assigned Benchmark by Alternative and Max PNV

	MAX PNV Assigned	E	B	PA	D	C	A
PNV (MM$)	902.1	896.7	840.7	821.4	817.7	804.0	721.1
Percent of MAX PNV Assigned	100.0	99.4	93.2	91.1	90.6	89.1	79.9

Max PNV Assigned Benchmark. The objective of the Max PNV Assigned Benchmark is to maximize the present net value (PNV) of outputs with market monetary values and assigned monetary values. With the exception of the constraints common to each alternative (non-declining yield, ending inventory, long-run sustained yield, culmination of mean annual increment, and minimum management requirement) no additional constraints were placed on this benchmark to achieve certain management practices, address issues, retain existing programs, or achieve quality levels. Refer to Appendix B for a complete discussion of constraints applied to all benchmarks and alternatives. The PNV of this benchmark is used as a reference point for evaluating the opportunity costs of achieving the objectives of the alternatives. This benchmark produced the highest PNV of all benchmarks and alternatives because the sole objective of the benchmark was to maximize economic efficiency with the least number or resource constraints. The most economically efficient combination of outputs and costs resulted.

Output levels in any benchmark or alternative which exceed the Max PNV benchmark cause a situation where costs of producing the output exceed the benefits.

Alternative E. The objective of Alternative E is to maximize PNV within the $8.1 million per year budget constraint applied to all other alternatives. The purpose was to evaluate the effect of the budget constraint on outputs and PNV. The budget constraint was needed to make the alternatives comparable and to keep them within estimated budget expectations. The opportunity cost between the Max PNV Benchmark (BM 4) and Alternative E is about $5.4 million. With limited funds, timber and grazing outputs are reduced and the proportion of dispersed recreation managed at less than standard service level increases. Developed recreation use remains nearly

the same. This indicates that recreation outputs are a better buy that timber and grazing outputs and can compete for limited funds.

Alternative B. The objectives of Alternative B are to produce the RPA targets assigned to the Forest in the Regional Guide within the annual $8.1 million budget constraint. The opportunity cost between Alternative E and Alternative B is about $56 million.

The $56 million decrease in PNV between Alternative E and Alternative B is caused by reductions in timber and grazing benefits. The Regional Guide timber target is about 32 percent lower than the Max PNV harvest level. Since timber output is cost efficient to produce up to the Max PNV level, timber output levels less that that in the Max PNV benchmark cause a reduction in net timber benefits and a corresponding decrease in PNV. Grazing targets, on the other hand, are higher than the Max PNV level and cause a decrease in net grazing benefits because outputs above the Max PNV level cost more than they return in benefits.

Alternative PA. The objectives of the PA Alternative are to improve land productivity and protect resource values while providing moderate increases from current levels of timber (North Kaibab Ranger District), fuelwood, and recreation outputs to resolve identified issues. The budget was limited to $8.1 million annually. The opportunity cost of Alternative PA is about $19.3 million when compared to Alternative B.

The decrease in PNV was caused primarily from a ten percent reduction in net developed recreation benefits. The reduction in net developed recreation benefits was because the present mix of public and private recreation sites was maintained and public investment in new sites was deferred to stay within the budget constraint. The deferment of new public investment and the limitation on the proportion of recreation opportunity provided by private investment reduced the recreation output and the net benefits.

A small part of the opportunity cost is caused by a reduction in timber output. Net timber benefits are reduced about three percent because an upper limit was placed on timber volume. The upper limit on the North Kaibab Ranger District was needed to balance existing mill needs with optimum wildlife habitat needs.

Alternative D. The objectives of Alternative D are to intensively manage the Forest for commodities having market values. These emphasized commodities were timber, grazing, and developed recreation. The budget was limited to $8.1 million per year consistent with the other alternatives. The opportunity cost of Alternative D is about $3.7 million when compared to Alternative PA.

The reduction in PNV is mainly caused by a reduction in total dispersed recreation output and management of a higher portion of the dispersed recreation at less than standard service level which results in a ten percent reduction in net dispersed recreation benefits.

There is also a 33 percent reduction in net grazing benefits because grazing outputs are produced above the economically efficient level. The emphasis of the alternative is on a grazing output production rather than economic efficiency.

The reductions in net dispersed recreation benefits and net grazing benefits are partially offset by increased net benefits from timber, wildlife, and developed recreation.

Alternative C. The objectives of Alternative C are to emphasize non-commodity outputs such as dispersed recreation, cultural resources, wildlife, wilderness recreation, and satisfactory watershed condition. The budget level was limited to $8.1 million per year compared to Alternative D.

The reduction in PNV is mainly caused by reductions in developed recreation and timber net benefits. Developed recreation net benefits decrease about 8 percent. This reduction is caused by an objective similar to Alternative PA to maintain the present mix of private and public sector recreation sites. Also, part of the developed recreation is managed at the less than standard service level reducing the net benefits.

Net timber benefits decrease about sixteen percent. This reduction was caused by an objective to limit timber harvest to no more than previous harvest levels and to achieve minimum old-growth objectives.

The reductions in developed recreation and timber offset by a ten percent increase in net dispersed recreation benefits.

Also, soil and water costs were higher in Alternative C than any other alternative. These costs are for increased watershed improvement projects to accelerate improvement of watershed conditions.

Alternative A. The objective of Alternative A is to project the effects of continuing current management into the future. The budget was limited to $7.3 million and limited to current management prescriptions. The opportunity cost of Alternative A is about $82.9 million when compared to Alternative C.

The reduction in PNV is caused by reductions in net developed and dispersed recreation benefits. Net developed recreation benefits are reduced about 39 percent and net dispersed recreation benefits are reduced about 25 percent. These reductions are because all recreation use is managed at less than standard service levels which have significantly lower benefit values. Also, Alternative A provides no new recreation site development and consequently produces less total recreation output than any other alternative.

A nineteen percent increase in net timber benefits partially offset the reduction caused by recreation.

The limitation to use only current management prescriptions also prevented selection of more economically efficient prescriptions. This also contributed to the reduction in PNV.

IRRETRIEVABLE COMMITMENT

Irretrievable resource commitments result from allocation decisions that reduce production or use of renewable resources. Irretrievable commitments represent opportunities foregone for the period the Forest Plan is in effect and reflect trade-offs made to integrate multiple-use considerations or to meet budget limitations. Significant irretrievable effects are summarized in Table 35. This table shows the calculation of the irretrievable effect as the difference between the highest output of any alternative and the output of each of the alternatives.

Table 35. Average Annual Irretrievable Resource Commitment in the First Decade By Alternative

	PA	A	B	C	D	E
DEVELOPED RECR.(MRVD)						
High Output	594.9	594.9	594.9	594.9	594.9	594.9
Output of Altern.	589.9	537.0	594.9	584.9	589.8	594.9
Irretrievable Comm.	5.0	57.9	0.0	10.0	5.1	0.0
DISPERSED RECR.(MRVD)						
High Output	279.2	279.2	279.2	279.2	279.2	279.2
Output of Altern.	279.2	254.8	278.7	279.2	255.3	254.3
Irretrievable Comm.	0.0	24.4	0.5	0.0	23.9	24.9
WILDERNESS USE (MRVD)						
High Output	7.4	7.4	7.4	7.4	7.4	7.4
Output of Altern.	7.4	3.7	7.4	7.4	7.4	7.4
Irretrievable Comm.	0.0	3.7	0.0	0.0	0.0	0.0
WILDLIFE (MWFUD)						
High Output	190	190	190	190	190	190
Output of Altern.	181	175	174	190	175	180
Irretrievable Comm.	9	15	16	0	15	10

Table 35. (cont.) Average Annual Irretrievable Resource Commitment in the First Decade By Alternative

	PA	A	B	C	D	E
RANGE CAPACITY (MAUM)						
High Output	74	74	74	74	74	74
Output of Altern.	70	71	74	63	71	69
Irretrievable Comm.	4	3	0	11	3	5
ALLOWABLE SALE QUANTITY (MMCF)						
High Output	19.5	19.5	19.5	19.5	19.5	19.5
Output of Altern.	14.5	12.1	14.5	13.1	13.7	19.5
Irretrievable Comm.	5.0	7.4	5.0	6.4	5.8	0.0
PINYON-JUNIPER FUELWOOD (MMBF)						
High Output	10	10	10	10	10	10
Output of Altern.	9	5	10	8	9	5
Irretrievable Comm.	1	5	0	2	1	5
WATER YLD.(MACFT)						
High Output	302.6	302.6	302.6	302.6	302.6	302.6
Output of Altern.	302.5	302.6	302.5	302.6	302.6	302.5
Irretrievable Comm.	.1	0	.1	0	0	.1

SUMMARY OF SIGNIFICANT EFFECTS

Developed Recreation - All Alternatives except Alternative A provide adequate developed recreation capacity to meet projected future use. Alternative A maintains a nearly even distribution between public and private sector developed facilities. Alternatives PA and C maintain the even distribution of public and private facilities in the early decades but gradually shift most of the facilities to the private sector in later decades. Alternatives B, D and E result in a dramatic shift to private sector operations by converting existing public sites to concession operations.

Developed recreation use is managed at the standard service level in Alternatives PA, B, D and E and enhance visitor experience, convenience and information. Alternatives A and C provide a portion of the developed recreation at less than standard service level, which will lower the level of visitor experience, convenience and information. Some facilities may be temporarily closed and occasional overuse may occur under less than standard service level management.

Dispersed Recreation - Alternatives PA, B and C manage nearly the entire Forest at standard service level and enhance visitor experience, convenience and information services. Alternatives A, D and E provide less than standard service level management for portions of the Forest which reduces the level of visitor experince, convenience and information. All alternatives except Alternatives A and D provide for a 27 percent increase in acreage closed to off-road vehicles.

Wilderness - Except for Alternative A, all wilderness is managed at standard service level. Alternative C provides for regular wilderness patrols, elimination of non-conforming uses, and increased visitor contacts by Wilderness Rangers and provides the highest level of wilderness enhancement and protection. Alternatives PA, B, D and E focus management efforts in high use areas and along wilderness boundaries to protect and maintain wilderness characteristics.

Visual Resources - Alternatives PA and B manage about one-third of the Forest under the high visual management intensity level and provide the greatest degree of visual diversity. Alternatives C and D manage most of the Forest under a moderate visual management intensity level. Under alterntives PA, B, C and D, landscape diversity is enhanced in sensitive road corridors and adjacent to developed recreation sites.

Alternative E manages about one-third of the Forest under the high visual management intensity level and provides visual diversity slightly less than Alternative D.

Alternative A provides the least visual diversity by managing the entire Forest under the low visual management intensity level.

Cultural Resources - Alternatives PA, B, C, D and E increase the area of cultural resource survey and focus surveys in woodland areas which currently receive little attention. The potential for inadvertent cultural resource site damage from project activities is greatest under Alternatives PA, B, C and E which have the highest level of project activity in woodland areas.

Alternatives PA, B and C provide for cultural resource surveys in non-project areas and cultural resource site evaluations. Alternatives D and E also provide for limited non-project related survey and site evaluations.

Wildlife - Alternatives PA and C provide the highest level of diversity and interspersion of habitat. Alternatives B and D show a moderate increase in diversity of habitats and Alternatives A and E reflect a decline in diversity.

Alternatives PA and C provide high levels of increased habitat quality. Alternatives B, D, and E provide a moderate level of increased habitat quality while Alternative A results in a slight decline in habitat quality.

Alternative PA provides the best distribution of diverse habitats and benefits the greatest number of management indicator species. Alternative C supplies a balance of habitats, and increases habitat capability for those indicator species using late seral stages of pine and mixed conifer. Alternatives PA and C result in the greatest increase in habitat capability for big game. Alternatives B and D provide moderate increase in habitat capability. Alternatives A and E result in declining habitat capability.

All alternatives provide for conserving threatened and endangered species and special management areas.

Riparian Habitats - Alternatives PA and C improve riparian habitat to satisfactory condition by the second decade. Alternatives A, B, and D improve a moderate amount of the riparian areas to satisfactory condition by the second decade. Alternative E improves a smaller area of riparian habitat.

Range - Alternatives PA, A, B, and D provide positive change in management intensity level while Alternatives C, and E reflect a decrease in intensity of management.

Timber - All alternatives provide adequate commercial sawtimber, products, and total fuelwood to meet projected future use. Alternative E best addresses the criteria for the resolution of the commercial timber issue. Alternative B best addresses the criteria for the resolution of the fuelwood issue. Alternative A provides the poorest resolution of both issues.

All alternatives illustrate compromises made in silviculture and timber management, to better resolve other forest resource issues, primarily wildlife habitat and range.

Watershed - All alternatives have a positive impact on watershed condition. However, only Alternatives PA, B, C, and D improve all watersheds to satisfactory condition. Alternatives A and E provide for gradual improvement of watershed condition but do not improve all watersheds to satisfactory condition.

Lands - Budget allocations in Alternatives PA, B, C and D allow for an overall efficient lands management program. Alternatives PA, B, C, D and E almost double the amount of National Forest System lands available for exchange. The majority of this increase is adjacent to Williams, Tusayan and Parks.

Minerals - Mineral prospecting and exploration activities are restricted in Alternatives PA, C and E by seasonal closures in and adjacent to important wildlife habitats, and along visually sensitive roadside corridors. All alternatives recommend additional mineral withdrawals to protect capital investments, threatened and endangered species habitats and visually sensitive areas.

ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

Developed Recreation - Increased user conflicts, and deterioration and closure of some sites occurs under Alternatives A and C since some of the developed recreation use is managed at less than standard service level.

Dispersed Recreation - Less than standard management results in some deterioration of desirable settings and increased user conflicts under Alternatives A, D and E.

Soil and vegetation damage may occur in sensitive areas from unrestricted off-road vehicle use under Alternatives A and D.

Wilderness - Wilderness administration is inadequate and may degrade wilderness values under Alternative A.

Visual Quality - A gradual decline in visual diversity may occur in some sensitive areas under Alternative A.

Cultural Resources - All alternatives except Alternative A provide for increased levels of project activity in the woodland vegetation type with a corresponding risk of inadvertent cultural resource site damage.

Timber - All alternatives illustrate compromises made in silviculture and timber management. Alternatives PA, B, C, and D allocate between 74 percent and 90 percent of the tentatively suitable acres to timber management. On these unsuitable coniferous acres, stand health and vigor declines and susceptibility to epidemic insect and disease outbreaks increases. Growth rates in the fifth decade vary from fifty percent of the LTSYC in Alternative B, to 80 percent in Alternative E. This analysis indicates that an irretrievable commitment of potential productivity is made under each alternative.

Increased fire hazard from slash created following intermediate cutting is an unavoidable short-term adverse effect for all alternatives. This adverse effect is mitigated through fuel treatment.

A reduction in visual diversity results under Alternative A from timber harvest activities along road corridors that may be considered visually sensitive in the future from increased recreation use.

Wildlife - Alternative A results in declining wildlife habitat diversity and capability.

Lands - Alternatives A and E only allow infrequent field inspection of special land use permits which may eventually lead to long-term management problems.

Minerals - Additional mineral withdrawals are recommended in all alternatives and may inhibit locatable mineral activities to some degree. Important wildlife habitats may be lost or severely impacted during primary use seasons from both locatable and leasable mineral activities under Alternatives B and D. Seasonal restrictions imposed on prospecting and exploration activities may increase mineral operating costs under all alternatives.

Air Quality - Transitory and localized effects will occur in all alternatives because of smoke from wildfire and prescribed burning. Alternative E results in the most area burned, followed by B, PA, C, D, and A in decreasing order of area burned.

Glossary

ACRE-EQUIVALENT - A unit of habitat output related to fish or wildlife habitat improvement projects. Acre equivalents are based on the acres of habitat that are influenced by an acre of habitat actually modified by the project. For example, an acre of winter range burned is credited with influencing five acres of summer range.

ACRE-FOOT - A water volume measurement equal to the amount of water that would cover one acre to a depth of one foot (43,560 cubic feet or 325,851 gallons).

ACTIVITY FUELS - Logging debris generated from any activity on the Forest such as fuelwood gathering, precommercial thinning, timber harvesting, and road construction, which increases fire potential.

ADMINISTRATIVE SITE - A site which primarily exists for general administrative purposes. It normally will include office, warehouse, outside storage, and parking areas. It may include housing and pasture for livestock. A work center may be part of an administrative headquarters site.

AFFECTED ENVIRONMENT - The biological, physical, social, and economic environment subject to changes that will or may take place, as a result of proposed human activity.

AGE CLASS - Interval of years, commonly twenty, into which trees are grouped for management. Example: 1 to 20 years, 21 to 40 years.

ALIENATED MINERAL RIGHTS - Ownership of the mineral rights is by someone other than the surface rights owner.

ALLOCATION - The assignment of management prescriptions to particular land areas to achieve the goals and objectives of an alternative.

ALLOWABLE SALE QUANTITY (ASQ) - The quantity of timber that may be sold from the area of land covered by the Forest Plan for a time period specified by the plan. The quantity is usually expressed on an annual basis as the average annual allowable sale quantity.

ALTERNATIVE - A proposition or situation offering a choice between two or more management methods, only one of which may be chosen.

AMENITY - The pleasurable, educational, or aesthetic features of the land or resources.

ANALYSIS AREA - One or more sites combined for the purpose of analysis in formulating alternatives and estimating various impacts and effects.

ANALYSIS OF MANAGEMENT SITUATION (AMS) - A determination of the ability of the planning area to supply goods and services in response to society's demand for those goods and services.

ANIMAL MONTH (AM) - One animal grazing for one month.

ANIMAL UNIT MONTH (AUM) - The quantity of forage required by one mature cow (1,000 pounds) or the equivalent for one month.

AQUATIC - Pertaining to standing and running water in streams, rivers, lakes, and reservoirs.

ARTERIAL ROADS - Roads that provide service to large land areas and usually connect with public highways or other Forest arterial roads to form an integrated network of primary travel for maximum mobility and travel efficiency, rather than specific resource-management service. They are usually developed and operated for long-term land and resource management purposes and constant service.

ARTIFACT - An object that has been modified, used, or constructed by man. Stone tools, pottery, buildings, roads, and mines are examples of artifacts.

ASSESSMENT - The Renewable Resource Assessment required by the Resources Planning Act (RPA).

AUM - See "Animal Unit Month."

AVAILABLE FOREST LAND - Land which has not been legislatively withdrawn by Congress or administratively withdrawn by the Secretary of Agriculture or Forest Service Chief from timber production.

B/C VALUES - See "Benefit/Cost Ratio."

BACKGROUND (VISUAL DISTANCE ZONE) - The distant part of a landscape; surroundings, especially those behind something, and providing harmony and contrast; area located from three to five miles to infinity from the viewer.

BASAL AREA - Measurement of how much of a site is occupied by trees. It is determined by measuring the square feet of the cross-section of all the trees per acre at breast height (4.5 feet).

BASE TIMBER HARVEST SCHEDULE - The timber harvest schedule in which the planned sale and harvest for any future decade is equal to or greater than the planned sale and harvest for the preceding decade of the planning period, and this planned sale and harvest for any decade is not greater than long-term sustained yield capacity. (36 CFR 219.3[c] NFMA Regulations)

BENCHMARK - A category of Forest Planning alternatives used to establish standards by which to compare alternatives considered in detail. Benchmark alternatives include minimum level, minimum acceptable level, maximum resource levels, and maximum present net value levels.

BENEFIT/COST RATIO - The total discounted benefits of any activity divided by the total discounted costs.

BIG GAME - The larger species of wild animals that are hunted, such as elk, deer, bighorn sheep.

BIOLOGICAL POTENTIAL - The maximum production of a selected organism that can be attained under optimum management.

BLM - Bureau of Land Management.

BOARD FOOT - Measure of an amount of timber equivalent to a piece 12" x 12" x 1". The boards bought at a lumber store are somewhat smaller because they have been planed smooth.

BOARD FOOT/CUBIC FOOT CONVERSION RATIO - Both board foot and cubic foot volumes can be determined for timber stands. The number of board feet per cubic foot of volume varies with tree species, diameter, height, and form factors.

BROWSE - Twigs, leaves, and young shoots of trees and shrubs on which animals feed; in particular, those shrubs which are utilized by big game animals or domestic livestock for food.

BUFFER-FILTER STRIP - A designated land or water area, along the perimeter of some land use, where activities are regulated so as to prevent unwanted effects into areas beyond the buffer.

CABLE LOGGING - A method for transporting logs from stumps to collecting points which utilizes a cable system as the main device for moving them.

CANOPY - The more or less continuous cover of branches and foliage formed collectively by the crown of adjacent trees and other woody growth.

CAPABILTIY - The potential of an area of land to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices and at a given level of management intensity. Capability depends upon current conditions and site conditions such as climate, slope, landform, soils, and geology, as well as the application of management practices, such as silviculture or protection from fires, insects, and disease.

CAPABILITY AREA - An area of land delineated for the purpose of estimating responses to various management practices, resource values, output coefficients, and multi-resource or joint production functions. Capability areas may be synonymous with ecological land units, ecosystems, or land response units. Capability areas are the single geographic delineations used to describe characteristics of the land and resources in integrated forest planning.

CAPABLE FOREST LAND - Land with a biological growth potential which is equal to or exceeds the minimum standard for timber production (an average annual growth rate of at least twenty cu. ft. per acre).

CAPABLE RANGE - Land that can produce forage for animal consumption without impairing other forage values; generally considered as land that is not being cultivated.

CARRYING CAPACITY - The optimum density of a species which a given environment or range is capable of sustaining, without deteriorating that environment or range.

CAVITY - The hollow excavated in trees by birds or other natural phenomena; used for roosting and reproduction by many birds and mammals.

CEQ - Council on Environmental Quality.

CFR - Code of Federal Regulations.

CHEMICAL WATER QUALITY - Measurements of chemical parameters (alkalinity, dissolved oxygen, dissolved iron, etc.) used to describe the quality of water.

CLEARCUTTING - Harvesting of all trees in one cut on an area for the purpose of creating a new, even-aged stand. The area harvested may be a patch, stand, or strip large enough to be mapped or recorded as a separate age class in planning. Regeneration is obtained through natural seeding, or through planting or direct seeding.

CULMINATION OF MEAN ANNUAL INCREMENT (CMAI) - Point in the age of a forest stand in which the mean annual growth increment no longer increases.

COLLECTOR ROADS - Roads that serve smaller land areas and are usually connected to Forest arterial roads or public highways. They collect traffic from local roads and terminal facilities. Collector roads are operated for constant use.

COMMERCIAL FOREST LAND (CFL) - Forest land which is producing or capable of producing crops of industrial wood and which has not been reserved or deferred from entry. This includes areas suitable for management to grow crops of industrial wood generally of a site quality capable of producing in excess of twenty cubic feet per acre of annual growth. This includes both accessible and inaccessible areas. Permanently inoperable or nonstockable areas are excluded because they are not suitable for silvicultural management. Conversely, nonstocked areas which could be stocked and otherwise meet this definition are included.

COMMERCIAL THINNING - Cutting for the sale of products (poles, posts, pulpwood, etc.) in immature stands to improve the quality and growth of the remaining stand.

COMMODITY OUTPUTS - A resource output with commercial value; all resource products which are articles of commerce.

COMMON VARIETY MINERALS - See minerals, common variety.

COMMUNITY LIFESTYLES - The ways in which residents conduct their everyday routines and how the "way they live" is associated with National Forest.

CONCERN - See management concern.

CONCESSION PERMIT - A permit which authorizes private individuals or corporations to operate a facility on National Forest Land as a commercial profit-making venture.

CONDEMNATION - In real property law, the process by which property of a private owner is taken for public use, without his consent, but requiring payment of just compensation.

CONIFER - A group of cone-bearing trees, mostly evergreen, such as the pine, spruce, fir, pinyon, juniper, etc.

CONSTRAINED MAXIMUM LEVEL BENCHMARK - The highest level of a particular output that could be produced over time, subject to the production of minimum acceptable levels for all other outputs.

CONSTRAINT - A quantification of the minimum or maximum amount of an output or cost that could be produced or incurred in a given time period.

CONSUMPTIVE USE - Those uses of a resource that reduce the supply. For example, some consumptive uses of water are: irrigation, domestic, and industrial use.

CORD - A unit of gross volume measurement for stacked round or split wood. A standard cord is 4' x 4' x 8' or 128 cubic feet. A standard cord may contain sixty to one hundred cubic feet of solid wood depending on the size of the pieces and the compactness of the stack.

CORRIDOR - A linear strip of land which has ecological, technical, economic, social, or similar advantages over other areas for the present or future location of transportation or utility routes.

COST COEFFICIENTS - Values which relate an acre of land to a particular dollar cost in a specific period of time.

COST EFFICIENCY - A comparative measure of economic efficiency determined by maximizing the present net value of an alternative, subject to meeting the objectives of the alternative.

COUNCIL ON ENVIRONMENTAL QUALITY (CEQ) - An advisory council to the President established by the National Environmental Policy Act of 1969. It reviews federal programs for their effect on the environment, conducts environmental studies and advises the President on environmental matters.

COVER/FORAGE RATIO - The ratio of cover (usually conifer types) to foraging areas (natural openings, clearcuts, etc.).

CRITICAL HABITAT - That portion of a wild animal's habitat that is critical for the continued survival of the species. Under Endangered Species Act, specific area designated for that species that is essential to survival of the species and which may require special management or protection.

CULTURAL RESOURCE - The physical remains of past human cultural systems and places or sites of importance in human history or prehistory.

DBH - Diameter at breast height. Diameter of a tree approximately 4 1/2 feet above the ground.

DEMAND TRENDS - The expected future need or desire for outputs, services, and uses.

DEPARTURE - A timber harvest schedule which deviates from the principle of nondeclining flow by exhibiting a planned decrease in the timber sale and harvest schedule at any time in the future. A departure can be characterized as a temporary increase, usually in the beginning decade(s) of the planning period, over the base sale schedule that would otherwise be established, without impairing the future attainment of the Forest's long-term sustained yield capacity.

DEVELOPED RECREATION - Recreation that requires facilities that result in concentrated use of an area. Examples are campgrounds and ski areas. Facilities might include: Roads, parking lots, picnic tables, toilets, drinking water, ski lifts, and buildings.

DIRECTIONAL DRILLING - The art of drilling a borehole wherein the course of the hole is planned before drilling. Such holes are usually drilled with rotary equipment at an angle to the vertical, and are useful in avoiding obstacles or reaching side areas.

DISPERSED RECREATION - Outdoor recreation which occurs on areas which are not developed for intensive recreation use. Dispersed areas include general undeveloped areas, roads, trails, and water areas not treated as developed sites.

DIVERSITY - The relative degree of abundance of wildlife species, plant species, communities, habitats, or habitat features per unit of area.

EA - Environmental Assessment.

EARLY FOREST SUCCESSION - The biotic community that develops immediately following the removal or destruction of the vegetation in an area.

ECONOMIC EFFICIENCY ANALYSIS - A comparison of the values of resource inputs (cost) required for a possible course of action with the values of resource outputs (benefits) resulting from such action. In this analysis, incremental market and non-market benefits are compared with investment and physical resource inputs.

ECONOMICS - The study of how resources, goods, and services are allocated among competing uses.

ECOSYSTEM - The system formed by the interaction of a group of organisms and their environment.

EDGE - The place where different plant communities , successional stages or vegetative conditions border upn each other.

EFFECTS - Results expected to be achieved relating to the physical, biological, and social (cultural and economic) factors resulting from a land use or activity. Examples of effects are tons of sediment, pounds of forage, person-years or employment, income, etc. There are direct effects, indirect effects, and cumulative effects.

ENDANGERED SPECIES - Any species which is in danger of extinction throughout all or a significant portion of its range.

ENDEMIC - Native or confined to a certain region; having a comparitively restricted distribution.

ENVIRONMENTAL ANALYSIS - An analysis of alternative actions and their predictable short- and long-term environmental effects which include physical, biological, economic, social, and environmental design factors and their interactions.

ENVIRONMENTAL ASSESSMENT - The concise public document required by the regulations for implementing the procedural requirements of NEPA (40 CFR 1508.9).

ENVIRONMENTAL IMPACT STATEMENT (EIS) - The version of the statement of Environmental Effects required for major Federal actions under Section 102 of the National Environmental Policy Act (NEPA), and released to the public and other agencies for comment and review. It is a formal document which must follow the requirements of NEPA, the Council on environmental Quality (CEQ) guidelines, and directives of the agency responsible for the project proposal.

EROSION - The wearing away of the land's surface by running water, wind, ice, or other geological agents. It includes detachment and movement of soil or rock fragments by water, wind, ice, or gravity.

EVAPOTRANSPIRATION - The conversion of water, whether open, as soil moisture, or within plants, into water vapor that is released into the atmosphere.

EVEN-AGED SILVICULTURE - The combination of actions that results in the creation of stands in which trees of essentially the same age grow together. Managed even-aged forests are characterized by a distribution of stands of varying ages (and therefore tree sizes) throughout the forest area. Regeneration in a particular stand is obtained during a short period at or near the time that the stand has reached the desired age or size and is harvested. Clearcutting, shelterwood cutting, seed tree cutting, and their many variations are the cutting methods used to harvest the existing stand and regenerate a new one. In even-aged stands, thinnings, weedings, cleanings, and other cultural treatments between regeneration cuts are often beneficial. Cutting is normally regulated by scheduling the area of harvest cutting to provide for a forest that contains stands having a planned distribution of age classes. [36 CFR 211.3[k] NFMA Regulations.]

EVEN-FLOW - Maintaining a relatively constant output of timber from decade to decade.

EXPERIENCE LEVELS - The range of opportunities for satisfying basic recreation needs of people. A scale of five experience levels ranging from "primitive" to "modern" is defined for the National Forest System.

EXTENSIVE GRAZING - Season-long use of rangelands, with distribution of livestock occurring through riding, salting, etc., instead of pasture rotation.

EYRIE - The nesting site of a bird of prey, as an eagle or a hawk.

FACILITY CONDITION CLASS - The rating system used in the Recreation Information Management system to classify the condition and maintenance needs of recreation sites and areas.

FAUNA - The animals of a given region or period.

FEE SITE - A Forest Service recreation area in which users must pay a fee. Fee sites must meet certain standards and provide certain facilities as specified in the Forest Service Manual.

FINAL CUT - Removal of the last seed bearers or shelter trees after regeneration is considered to be established under a shelterwood system.

FIRE HAZARD - The fuel in which a fire will ignite and burn.

FIRE MANAGEMENT AREA - One or more parcels of land with clearly defined boundaries and with established fire management direction which is responsive to land and resource management goals and objectives.

FIRE MANAGEMENT/EFFECTIVENESS INDEX (FMEI) - The index value measures effectiveness of annual fire management operational programs. It is a planning, attainment, analysis, and evaluation tool for both annual and long-term programs. Measured in dollars per thousand acres protected, the objective is to minimize the index value.

FIRE RISK - The probability of a fire starting from natural or man-made causes.

FISHERIES HABITAT - Streams, lakes, and reservoirs that contain and support fish.

FLOOD PLAIN - Land adjacent to a channel which is covered with water when the stream overflows its banks.

FLOODPLAIN - Low land and relatively flat areas joining inland and coastal waters, including debris cones and flood prone areas of offshore islands. The minimum area included is that subject to a one percent (100-year recurrence) or greater change of flooding in any given year.

FLORA - The plants of a given region or period.

FORAGE - All nonwoody plants (grass, grass-like plants and forbs) and portions of woody plants (browse) available to domestic livestock and wildlife for food. Only a portion of a plant is available for forage if the plant is to remain healthy.

FORAGE AND HERBAGE - Forage refers specifically to all browse and nonwoody plants that are available to livestock or game animals and used for grazing or harvested for feeding. Herbage may also include material not acceptable to grazing or browsing animals.

FORAGE UTILIZATION - (1) The portion of current year's forage production by weight that is consumed or destroyed by grazing animals. Syn., degree of use. Expressed in percent of current year's growth utilized by grazing animals on an average over time based on a system of range management that will maintain the key forage species while achieving other management objectives such as the maintenance of watersheds, wildlife habitat, and recreational values and the protection of regenerating plants. (2) The percent expressed in the "Prescriptions for Management Areas" is the estimated average forage utilization allowable to meet the objectives of that prescription under sustained-yield management.

FORB - Any herbaceous plant other than grass or grass-like plants.

FOREGROUND (VISUAL DISTANCE ZONE) - The part of a scene, landscape, etc., which is nearest to the viewer, and in which detail is evident, usually one-half to one-quarter mile from the viewer.

FOREST AND RANGELAND RENEWABLE RESOURCES PLANNING ACT OF 1974 - A Act of Congress requiring the preparation of a program for the management of the National Forests' renewable resources, and of land and resource management plans for units of the National Forest System. It also requires a continuing inventory of all National System lands and renewable resources.

FOREST LAND - Land at least ten percent stocked by forest trees of any size, or formerly having had such tree cover, and not currrently developed for nonforest use.

(FOREST LAND) CAPABLE - Forest land which is capable of growing industrial crops of wood at or above the minimum biological growth established by the Regional plan. The classification includes both accessible and inaccessible, stocked and non-stocked land.

(FOREST LAND) CAPABLE AND AVAILABLE - Capable forest land which has not been legislatively withdrawn or administratively withdrawn from timber production by the Secretary or the Chief of the Forest Service.

(FOREST LAND) CAPABLE BUT NOT AVAILABLE - Capable forest land which has been legislatively withdrawn or administratively withdrawn from timber production by the Secretary or Chief of the Forest Service. Capable but not available forest land is classed as not suited for timber production.

(FOREST LAND) CAPABLE-RESERVED - Capable forest land which has been legislatively withdrawn or administratively withdrawn from timber production on a permanent basis. Examples of this classification are: Wilderness Areas, Primitive Areas, Research Natural Areas, or special interest areas, or similar formal withdrawals approved by the Chief or higher authority.

(FOREST LAND) NOT CAPABLE - Forest land which is not capable of growing industrial crops of wood at least at the minimum biological growth potential of twenty cubic feet per acre annually as established in the Regional plan. Forest land not capable is classed as land not suited for timber production.

FOREST PLAN - A process, required by Law, for assessing economic, social, and environmental impacts, which describes how land and resources will provide for multiple use and sustained yield of goods and services.

FOREST SUPERVISOR - The official responsible for administering the National Forest System lands in a Forest Service Administrative unit, which may consist of one or more National Forests or all the Forests within a State. This person reports to the Regional Forester.

FOREST SYSTEM ROAD - Roads that are part of the Forest development transportation system, which includes all existing and planned roads, as development transportation facilities.

FOREST-WIDE STANDARD - A principle requiring a specific level of attainment, a rule to measure against. The Forest-wide standard applies to all areas of the Forest regardless of the other prescriptions applied.

FORPLAN - A linear programming model used for developing and analyzing Forest planning alternatives.

FSH - Forest Service Handbook.

FSM - Forest Service Manual.

FUEL BREAK - A zone in which fuel quantity has been reduced or altered to provide a position for suppression forces to make a stand against wildfire. Fuel breaks are designated or constructed before the outbreak of a fire. Fuel breaks may consist of one or a combination of the following: natural barriers, constructed fuelbreaks, man-made barriers.

FUEL MODEL - A simulated fuel complex for which all the fuel descriptions required by the mathematical fire spread model have been specified.

FUELS - Materials, including both living plants and dead, woody, vegetative materials, which are capable of burning.

FUELS MANAGEMENT - Manipulation or reduction of fuels to meet Forest protection and management objectives while preserving and enhancing environmental quality.

FUELWOOD - Wood that is round, split or sawed, and cut into short lengths for burning. Also known as firewood.

FULL SERVICE MANAGEMENT - Management of developed recreation facilities to provide optimum maintenance and enchance visitor experience.

GAME SPECIES - Any species of wildlife or fish for which seasons and bag limits have been prescribed, and which are normally harvested by hunters, trappers, and fishermen under State or Federal laws, codes, and regulations.

GAUGING STATIONS - Continuous streamflow measuring station.

GOAL - A concise statement of the state or condition that a land and resource management plan is designed to achieve. A goal is usually not quantifiable and may not have a specific date for completion. [36 CFR 219.2[1]]

GOODS AND SERVICES - The various outputs produced by forest and range land renewable resources, the tangible and intangible values of which are expressed in market and nonmarket terms.

GRAZING CAPACITY - The maximum level at which animals can graze an area without damage to the vegetation or related resources.

GRAZING PERMITTEE - An individual who has been granted written permission to graze livestock for a specific period on a range allotment.

GROUNDWATER - Subsurface water in a saturated zone or geologic stratum.

GROUP SELECTION CUTTING - Involves the removal of small groups of trees to meet a predetermined goal of age distribution and species in the remaining stand. The distance across an opening created by removal of a group of trees is usually no more than one to two mature tree heights.

GROWING STOCK LEVEL [GSL] - Expressed in either stems per acre or square feet of basal area of timber growing on any area.

GUIDELINE - an indication or outline of policy or conduct.

HABITAT - The place where animals live. It can be water for beaver, fish, and aquatic insects; rocks for pika, bats, and some species of birds; or forested areas for many mammals, birds; or forested areas for many mammals, birds, and reptiles.

HABITAT CAPABILITY - see Carrying Capacity.

HABITAT TYPE - An aggregation of all land areas potentially capable of producing similar plant communities at climax.

HARDWOOD - A conventional term for the timber of broad-leaved trees, and the trees themselves, belonging to the botanical group, Angiospermae.

HARVEST CUT - The removal of a stand of trees as a final cut in even-aged management, or the removal of mature trees in uneven-aged management. Regeneration encouragement is emphasized.

HERBICIDE - A chemical compound used to kill or control growth of undesirable plant species.

HERBIVORE - An animal that feeds on plant substances.

HIDING COVER - Plants or other objects used by wildlife for concealment. Adequate big-game cover is defined as vegetation capable of hiding ninety percent of a standing elk from a viewer at a distance of 200 feet or less.

HORIZONTAL STRUCTURE - The arrangement of single age and size classes by stands. Stands representing different age and size classes should be distributed within a forested area.

HYDROLOGIC FUNCTION - The ability of a watershed to sustain favorable conditions of streamflow. Favorable conditions of streamflow are measured in terms of water quality, quantity and timing.

IMPLEMENTING REGULATIONS - Regulations generated by an agency to implement an Act of Congress, i.e., 36 CFR 219 contains implementing regulations for RPA and NFMA.

IMPROVEMENT - Man-made developments such as roads, trails, fences, stock tanks, pipelines, power and telephone lines, survey monuments, and ditches.

IN-HOLDINGS - Lands within the proclaimed boundaries of a National Forest that are owned by some other agency, organization, or individual.

INDICATOR SPECIES - A wildlife species whose presence in a certain location or situation at a given population level indicates a particular environmental condition. Population changes are believed to indicate effects of management activities on a number of other wildlife species.

INDIGENOUS SPECIES - Species historically native to an area; not introduced by man.

INSECTICIDE - An agent used to control insect populations.

INSTREAM FLOW - That streamflow necessary to meet seasonal streamflow requirements for maintaining aquatic ecosystems, visual quality, and recreational opportunities on National Forest lands at acceptable levels.

INTEGRATED PEST MANAGEMENT - A management strategy for suppression of forest pests which integrates silvicultural mechanical, biological, and chemical suppression strategies which achieve greater efficiency and safety than the same strategies used alone.

INTENSIVE GRAZING - Grazing management that controls distribution of cattle and duration of use on the range, usually by fences, so parts of the range are rested during the growing season. See Livestock Grazing Management Level D.

INTERDISCIPLINARY TEAM (ID Team)) - A group of individuals with differing complementary skills. An interdisciplinary team is assembled because no single scientific discipline is sufficient to adequately identify and resolve issues and problems. Team member's interaction provides necessary insight to all stages of the process.

INTERMEDIATE CUTTING - Any removal of trees from a stand between the time of its formation and the regeneration cut. Most commonly applied intermediate cuttings are release, thinning, improvement, and salvage.

INTERMITTENT STREAM - A stream which flows only at certain times of the year when it receives water from springs or from some surface source such as melting snow in mountainous areas.

INTERPRETIVE SITES - A developed site at which a broad range of natural or cultural history is interpreted or described for the enjoyment of the public.

INTOLERANT SPECIES - Those plant species that do not grow well in shade.

INVERSION - A stable layer of air where the temperature of the air increases with height.

ISSUE - A subject or question of widespread public discussion or interest regarding management of National Forest System Lands.

KEY AREA - In grazing, that portion of a pasture or grazing unit, which because of its nature, serves to control the pattern of grazing use for the pasture as a whole. For wildlife, that specific portion of the habitat for a species which tends to limit the number of animals which can survive in that area, such as key winter range.

KEY HABITAT - See Key Area.

K-V FUNDS - In 1930, Congress passed the Knutson-Vandenberg Act (K-V Act) to authorize collection of funds (K-V Funds) for reforestation and timber stand improvement work on areas cut over by a timber sale.

LAND EXCHANGE - The conveyance of non-Federal land or interests to the United States in exchange for National Forest System land or interests in land.

LAND LINE - For Forest Plan purposes, National Forest property boundaries.

LATE FOREST SUCCESSION - A stage of forest succession where the majority of trees are mature or over-mature.

LEASABLE MINERALS - Minerals such as coal, oil, gas, phosphate, sodium, potassium, oil, oilshale, and geothermal steam which fall under the authority of the Mineral Leasing Act of 1920, as amended.

LINEAR PROGRAM MODEL - A mathematical method used to determine the best use of resources to achieve a desired result when limitations on available resources can be expressed in the form of equations.

LIVESTOCK GRAZING MANAGEMENT LEVELS -

Level A - Livestock grazing is entirely eliminated or restricted to situations where it will meet other resource objectives, such as fuel hazard reduction in recreation areas. Areas managed under Level A are not counted as full capacity range in the determination of livestock forage capacities.

Level B - Livestock grazing is very limited. Management is generally accomplished by moving livestock from one place to another. On areas managed under Level B, capacity and actual use are kept in balance by removing or adding livestock. There is very little structural improvement work done, such as fences or water development, and no forage improvement work.

Level C - Level C management controls livestock use through the use of structural improvements and physical movement of livestock. Long-term capacities are balanced with use through adjustments in numbers of livestock. Any forage improvement is generally the result of meeting other resource objectives, such as wildlife habitat improvement.

Level D - Areas under Level D management are managed intensively for livestock grazing within an overall multiple-use concept. Any structural or nonstructural [forage] improvement technique may be used as long as it fits with the natural environment. All reasonable and approved management techniques are applied to sustain capacity and use at high levels.

Level E - Level E management is applied to areas to achieve the maximum livestock production that the land can support. Any management technique can be applied as long as basic watershed values are protected. Some management activities, such as irrigating or large scale planting of non-native grass species, may change the natural character of the land.

Level U - Unsatisfactory level of grazing management in which the range is overstocked and the general trend in range condition is downward.

LOCAL ROADS - These roads connect terminal facilities with Forest collector or Forest arterial roads, or public highways. The location and standard are usually those required to serve a specific resource activity, such as campground access, or a timber sale, rather than overall travel efficiency.

LOCATABLE MINERALS - Those hardrock minerals which are mined and processed for the recovery of metals, and which qualify for the location of mining claims on public land. May include certain nonmetallic minerals such as valuable and distinctive deposits of limestone or silica. May include any solid natural inorganic substance occurring in the crust of the earth, except for the common varieties of mineral materials and leasable minerals. Locatable minerals are administered under the authority of the general mining laws.

LONG-TERM - Action governed by the Forest Plan generally taking place over a period longer than ten years from the present.

LONG-TERM SUSTAINED YIELD CAPACITY (LTSYC) - The highest uniform wood yield from lands being managed for timber production that may be achieved and sustained under a specified intensity of management consistent with multiple use objectives.

MAINTENANCE - The upkeep of all Forest development transportation facilities, including surfaces and shoulders, parking and side areas, structures, and such traffic control devices as are necessary for its safe and efficient utilization (36 CFR 212.1, FSM 1023.4, 7732.05). Maintenance is not for the purpose of upgrading a facility, but rather, to bring it to the originally constructed or subsequently reconstructed condition.

MANAGEMENT AREA - An area that has common direction throughout that differs from neighboring areas. The entire Forest is divided into management areas. Each is described, and policies and prescriptions relating to its use are listed.

MANAGEMENT CONCERN - A matter of importance to the management of the National Forest System Lands, which is identified internally by the agency. An issue or problem requiring resolution or a condition constraining management practices.

MANAGEMENT DIRECTION - A statement of multiple-use and other goals and objectives, the management prescriptions, and the associatd standards and guidelines for attaining them. [36 CFR 219.3[r] NFMA Regulations]

MANAGEMENT EMPHASIS - A reflection of allocation choices for an analysis area. Management emphasis, as used in FORPLAN, is a six-letter identifier used to describe (name) a prescription in FORPLAN.

MANAGEMENT INDICATOR SPECIES - See Indicator Species.

MANAGEMENT INTENSITY - The relative cost of a possible management direction and/or management practice.

MANAGEMENT OPPORTUNITY - A statement of general actions, measures, or treatments that address the public issue or management concern in a favorable way.

MANAGEMENT PRACTICE - A specific action, measure, or treatment.

MANAGEMENT PRESCRIPTION - Management practices selected and scheduled for application in a specific area to attain multiple use and other goals and objectives.

MANAGEMENT TEAM - Decision-making group consisting of the Forest Supervisor, Program Staff Officers, and District Rangers.

MARGINAL ANALYSIS - A type of analysis in which the only costs and benefits considered are those about which decisions can be made. Fixed benefits and costs are not considered.

MARKET-VALUED OUTPUTS - Goods and services valued in terms of what people are willing to pay for them rather than go without, as evidenced by market transactions.

MASS MOVEMENT - Downslope unit movement of a portion of the land's surface, i.e., a single landslide or the gradual simultaneous downhill movement of a whole mass of loose earth material on a slope face.

MAUM'S (THOUSAND AUM'S) - A symbol to indicate 1,000 animal unit months of grazing or range forage.

MAXIMUM MODIFICATION (VQO) - A visual quality objective meaning man's activity may dominate the characteristic landscape but should appear as a natural occurrence when viewed as background.

MBF (THOUSAND BOARD FEET MEASURE) - A symbol to indicate 1,000 board feet of wood fiber volume, either in log form or after conversion into lumber.

MEAN ANNUAL INCREMENT (MAI) - The total increase in girth, diameter, basal area, height, or volume of individual trees of a stand up to a given age divided by that age.

MIDDLEGROUND (VISUAL DISTANCE ZONE) - That part of a scene or landscape which extends from the foreground zone to three to 5 miles from the observer.

MIGRATION ROUTE - A travel route used routinely by wildlife in their seasonal movement from one habitat to another.

MIH CODES - Management Information Handbook codes for defined activities, outputs and effects.

MINERAL DEVELOPMENT - The preparation of a proven deposit for mining.

MINERAL ENTRY - The right under the General Mining Law of 1872, as amended, to enter nonwithdrawn public domain land, such as National Forests, and to explore for, extract, and sell certain locatable minerals; protected by the filing of a lode, placer, or mill site claim.

MINERAL ENTRY WITHDRAWAL - Public lands withdrawn from entry under the General Mining Laws and/or the mineral leasing laws.

MINERAL EXPLORATION - The search for valuable minerals on lands open to mineral entry.

MINERAL PRODUCTION - Extraction of mineral deposits.

MINERAL SOIL - Weathered rock materials without any vegetative cover.

MINERALS, COMMON VARIETY - Deposits which, although they may have value for use in trade, manufacture, the sciences, or in the mechanical or ornamental arts, do not possess a distinct, special economic value for such use over and above the normal uses of the general sum of such deposits. May include sand, stone, gravel, pumicite, cinders, pumice (except that occurring in pieces over two inches on a side), clay, and petrified wood. Common variety mineral material disposals are made under the authority of the Mineral Materials Act of 1947, as amended.

MINERALS, LEASABLE - Minerals such as coal, oil, gas, phosphate, sodium, potassium, oil shale, sulphur (in Louisiana and New Mexico), and geothermal steam which fall under the authority of the Mineral Leasing Act of 1920, as amended.

MINERALS, LOCATABLE – Those hardrock minerals which qualify for the location of mining claims on public land. Generally, they are mined and processed for the recovery of the minerals; often metallic. May include certain nonmetallic minerals and uncommon varieties of mineral materials such as valuable and distinctive deposits of limestone or silica. May include any solid, natural inorganic substance occurring in the crust of the earth, except for the common varieties of mineral materials and leasable minerals. Locatable minerals are administered under the authority of the general mining laws.

MINIMUM LEVEL MANAGEMENT – The management strategy that would meet only the basic statutory requirements of administering unavoidable, nondiscretionary land uses, preventing damage to adjoining lands in other ownerships, and protecting the life, health, and safety of incidental users.

MINIMUM STREAMFLOWS – A specified level of flow through a channel that must be maintained by the users of the stream for biological, physical, or other purposes.

MINING CLAIMS – That portion of the public estate held for mining purposes in which the right to exclusive possession of locatable mineral deposits is vested in the locator of those deposits.

MINING PATENTS – See patented mining claims.

MITIGATE – To lessen the severity.

MMBF (MILLION BOARD FEET MEASURE) – A symbol to indicate 1,000,000 board feet of wood fiber volume either in log form or after conversion into lumber.

MODIFICATION (VQO) – A visual quality objective meaning man's activity may dominate the characteristic landscape but must, at the same time, utilize naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed in foreground or middleground.

MONITORING AND EVALUATION – The periodic evaluation on a sample basis of Forest Plan management practices to determine how well objectives have been and how closely management standards have been applied.

MULTIPLE USE – The management of all various renewable surface resources of the National Forests so that they are utilized in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; that some land will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output.

NATIONAL ENVIRONMENTAL POLICY ACT – An act to declare a National policy which will encourage productive and enjoyable harmony between man and his environment, to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man, to enrich the understanding of the ecological systems and natural resources important to the Nation and to establish a Council on Environmental Quality.

NATIONAL FOREST LANDSCAPE MANAGEMENT SYSTEM – The art and science of planning and administering the use of forest lands in such ways that the visual effects maintain or upgrade man's psychological welfare. It is the planning and design of the visual aspects of multiple use land management.

NATIONAL FOREST MANAGEMENT ACT – A law passed in 1976 as amendments to the Forest and Rangeland Renewable Resources Planning Act that requires the preparation of Regional and Forest Plans and the preparation of regulations to guide that development.

NATIONAL FOREST SYSTEM LAND – National Forests, National Grasslands, and other related lands for which the Forest Service is assigned administrative responsibility.

NATIONAL RECREATION TRAILS – Trails designated by the Secretary of the Interior or the Secretary of Agriculture as part of the National system of trails authorized by the National Trails System Act. National recreation trails provide a variety of outdoor recreation uses in or reasonably accessible to urban areas.

NATIONAL REGISTER OF HISTORIC PLACES – A listing (maintained by the National Park Service) of areas which have been designated as being of historical significance. The Register includes places of local and state significance as well as those of value to the Nation as a whole.

NATIONAL WILD AND SCENIC RIVER SYSTEM – Rivers with outstanding remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values designated by Congress under the Wild and Scenic Rivers Act for preservation of their free-flowing condition.

NATIONAL WILDERNESS PRESERVATION SYSTEM - All lands covered by the Wilderness Act and subsequent wilderness designations, irrespective of the department or agency having jurisdiction.

NEPA - See National Environmental Policy Act.

NFMA - See National Forest Management Act.

NO ACTION ALTERNATIVE - The most likely condition expected to exist in the future if current management direction would continue unchanged.

NON-COMMERCIAL FOREST LAND - See "(Forest Land) Not Capable."

NON-DECLINING YIELD - A level of timber production designed so that the planned sale and harvest for any future decade is equal to or greater than the total planned sale and harvest for the preceding decade.

NON-FOREST LAND - Land that has never supported forests and lands formerly forested where use for timber utilization is precluded by development for other use. Includes areas used for crops, improved pasture, residential areas, improved roads of any width and adjoining clearings, and powerline clearing of any width. If intermingled in forest areas, unimproved roads and non-forest strips must be more than 120 feet wide, and clearing more than one acre in size to qualify as non-forest land. The non-forest land is classified as land not suited for timber production.

NON-GAME SPECIES - Animal species that are not usually hunted. This classification is determined by the State Legislature.

NON-STRUCTURAL RANGE IMPROVEMENT - An improvement to grazing land consisting of a modification of existing vegetation. Examples are spraying or plowing sagebrush and seeding to grass.

NONCOMMODITY OUTPUTS - A resource output that cannot be bought and sold.

NONCONSUMPTIVE USE - Those uses of resources that do not reduce the supply. For example: Nonconsumptive uses of water included hydroelectric power generation, boating, swimming, etc.

NONDECLINING YIELD - A level of timber production designed so that the planned sale and harvest for any future decade is equal to or greater than the total sale and harvest for the preceding decade.

NONMARKET VALUED OUTPUTS - Goods and services valued in terms of what reasonable people would be willing to pay rather than go without the output. Those obtaining the outputs do not pay all or part of what they would be willing to.

NONPOINT SOURCE POLLUTION - Sources of pollution that are diffuse in origin, their transportation into receiving water not well defined or constant, their discharge occurring at many diffuse locations, and depending heavily on weather conditions such as rainstorms or snowmelt. Pollution from forest management is of this type.

NOTICE OF INTENT - Written notice to the affected District Ranger by those who intend to engage in mining activity on the Forest.

NOXIOUS WEED - A noxious, destructive, or troublesome plant when found to be in epidemic proportions and of economic importance to threaten the public welfare.

OBJECTIVE - A clear and specific statement of planned results to be achieved within a stated time period. The results indicated in the statement of objectives are those which are designed to achieve the desired condition represented by the goal. An objective is measurable and implies precise time-phased steps to be taken and resources to be used which, together, represent the basis for defining and controlling the work to be done.

OBJECTIVE FUNCTION - A term in linear programming describing the criterion to be optimized in the model. Examples of objective functions are: maximize timber, maximize livestock forage, or maximize present net value.

OBLITERATION - The returning of the land occupied by a road or trail to resource production.

OCCUPANCY TRESPASS - The illegal occupation or possession of National Forest Land.

OLD-GROWTH - The last stage in forest succession. Old-growth habitat is the sum of the physical and biological components of old-growth forest that are essential to maintaining populations of certain old-growth dependent species of wildlife.

ON-SITE SOIL LOSS - The movement of soil away from one point to another location.

OPERATIONS PLAN - A written plan, approved by a Forest Officer, prepared by those engaged in mining activity on the Forest, describing mining and mineral processing activities that will likely cause a significant disturbance of surface resources. An approved Plan of Operations is required prior to an operator undertaking any exploration or development activities which may cause significant surface disturbance.

OPPORTUNITY COSTS - The value of the benefits foregone or given up due to the effect of choosing another management alternative that either impacts existing outputs or shifts resources away from other activities so that they are no longer produced and their benefits are lost.

ORV - Off-road vehicles; this includes all mechanical means of transportation; passenger cars, four-wheel-drive vehicles, trail bikes, and snowmobiles that are capable of traveling over land where no road exists.

OUTPUT COEFFICIENT - Values which relate an acre of land to a particular quantity of output in a specific period of time.

OUTPUTS - The goods, services, products, and concerns which are measurable and capable of being used to determine the effectiveness of programs and activities in meeting objectives. Also goods, and products, or services that are purchased, consumed, or utilized directly by people. A broad term for describing any result, product, or service that a process or activity actually produces.

OVERSTORY - That portion of the forest of more than one story forming the upper layer or uppermost canopy.

PAOT - See "Persons-At-One-Time."

PARTIAL RETENTION (VQO) - A visual quality objective which in general means man's activities may be evident but must remain subordinate to the characteristic landscape.

PARTICULATES - Small particles suspended in the air and generally considered pollutants.

PATENTED MINING CLAIM - A mining claim to which the Federal Government has granted the claimant all surface and some or all mineral rights. Patented mining claims are private land and may be sold or used for purposes other than mining, such as residential or recreational use.

PERENNIAL STREAM - Streams that flow throughout the year and from source to mouth.

PERMITTED GRAZING - Use of a National Forest range allotment under the terms of a grazing permit.

PERSONS-AT-ONE-TIME (PAOT) - A recreation-capacity measurement term indicating the number of people that can comfortably occupy and use a facility or area at one time.

PLANNING AREA - The area covered by a Regional or Forest Plan.

PLANNING CRITERIA - Standards, tests, rules, and guidelines by which the planning process is conducted and upon which judgements and decisions are based.

PLANNING HORIZON - The overall time period considered in the planning process that spans all activities covered in the analysis or plan and all future conditions and effects of proposed actions which would influence the planning decisions.

PLANNING PERIOD - One decade. The time interval within the planning horizon that is used to show incremental changes in yields, costs, effects and benefits.

PLANNING PROCESS - A system that records decisions and activities that result from the process of developing, revising or amending a Forest Plan.

PLANTATION - A forest crop or stand established by seeding or planting of young trees.

POLE TIMBER - As used in timber survey, a size class definition, trees 5.0 to 8.9 inches at DBH. As used in logging operations, trees from which pole products are produced, such as telephone poles, pilings, etc.

POLICY - A guiding principle on which to base a specific decision or set of decisions.

POTHUNTING - Slang term used by professional archaeologists to describe illegal or non-professional collecting of relics.

PRACTICE - See management practice.

PRECOMMERCIAL THINNING - The selective felling, killing, or removal of trees in a young stand primarily to accelerate diameter growth on the remaining stems, maintain a specific stocking or stand density range, and improve the vigor and quality of the trees that remain. A thinning done in a stand of trees not yet of commercial size.

PREDATOR - An animal species that kills and feeds on other animals.

PREPARATORY CUT - Removal of trees near the end of a rotation so as to permanently open the canopy and enlarge the crowns of seed bearers, with the intent of improving conditions for seed production and natural regeneration, as typically in shelterwood systems.

PRESCRIBED FIRE - The intentional application of fire to wildlands fuels under such conditions as allow the fire to be confined to a predetermined area and at the same time to produce the intensity of heat and rate of spread required to further certain planned objectives of silviculture, wildlife management, etc.

PRESCRIPTION - See management prescriptions.

PRESENT NET VALUE - The difference of net benefits and net costs, each discounted to the present.

PRESERVATION (VQO) - A visual quality objective that provides for ecological change only.

PRESUPPRESSION - Activities required in advance of fire occurrence to ensure effective suppression action. Includes (1) recruiting and training fire forces; (2) planning and organizing attack methods; (3) procuring and maintaining fire equipment and other facilities necessary for the fire program.

PRIMARY CAVITY NESTERS - Wildlife species that excavate cavities in trees for nest sites.

PRIMITIVE ROS CLASS - A classification of the recreation opportunity spectrum characterized by an essentially unmodified environment, where trails may be present but structures are rare, and where there is isolation from the sights and sounds of man.

PRODUCTION POTENTIAL - The capability of the land or water to produce living organisms and their useful features (forage, habitat, wood, etc.).

PRODUCTION-UTILIZATION SURVEYS (P-U SURVEYS) - Surveys of range land to determine where and how much forage is being produced, and how it is being used.

PRODUCTIVITY - See site productivity.

PROGRAM DEVELOPMENT AND BUDGETING - The process by which activities for the Forest are proposed and funded through the Federal Budget.

PROPOSED ACTION - In terms of the National Environmental Policy Act, the project, activity, or action that a Federal agency intends to implement or undertake and is the subject of an environmental assessment.

PUBLIC ACCESS - A road or trail route over which a public agency claims a right-of-way available for public use.

PUBLIC ISSUE - A subject or question of widespread public interest relating to the planning problem.

PUBLIC PARTICIPATION ACTIVITIES - Meetings, conferences, seminars, workshops, tours, written comments, response to survey questionnaires, and similar activities designed and held to obtain comments from the general public and specific publics about National Forest System land management planning.

RANGE ALLOTMENT - A designated area of land available for livestock grazing upon which a specified number and kind of livestock may be grazed under a range allotment management plan.

RANGE CAPACITY LEVELS - Levels are described as follows:

> No allowable capacity - Lands that are incapable of sustaining grazing by livestock under reasonable management goals. Examples include areas that are incapable of producing vegetation, soils that cannot produce vegetation at a satisfactory rate to protect itself from erosion, and slopes over 45 percent.
>
> Potential Capacity - Lands presently presently incapable of sustaining grazing, but which could be grazed if a management or other improvement were made. Examples are areas denuded but which could be revegetated, areas having a dense tree cover and no forage, or areas requiring access or water development to bring them up to full capacity.

Full Capacity - Land presently stable because effective ground cover is holding soil loss to acceptable levels, where forage is being produced and which is accessible and available to livestock.

RANGE CONDITION - The state of the plant community on a range site in relation to the potential natural plant community for that site. It is usually rated in the general categories of Poor, Fair, Good, or Excellent.

RANGE CONDITION TREND - The direction of change in range condition and soil productivity.

RANGE INVENTORY (ANALYSIS) - The systematic collection and analysis of resource information needed for managing rangeland. Examples are mapping and measuring plant composition, density and vigor.

RANGELAND (RANGE) - Land that supports vegetaion useful for grazing. Vegetation is routinely managed through manipulation of grazing animals rather than cultural practices.

RANGER DISTRICT - An administrative subdivision of the Forest supervised by a District Ranger who reports to the Forest Supervisor.

RARE II - See Roadless Area Review and Evaluation II.

REAL INCOME - Income based on real dollar values (values from which the effect of change in purchasing power of the dollar has been removed).

RECORD OF DECISION -Under CEQ Regulations, a document separate from but associated with an environmental impact statement that publicly and officially discloses the responsible official's decision on the proposed action.

RECREATION CAPACITY - The number of people that can take advantage of the supply of recreation opportunity without substantially diminishing the quality of the experience sought after.

RECREATION OPPORTUNITY SPECTRUM - A land classification system which categorizes National Forest land into six classes, each class being defined by its setting and by the probable recreation experiences and activities it affords. The six classes in the spectrum are primitive, semi-primitive, non-motorized, semi-primitive motorized,roaded natural, rural, and urban.

RECREATION RESIDENCE SITE - House or cabin permitted on National Forest land for the recreational use of the owner, but not as a primary residence.

RECREATION VISITOR DAY (RVD) - Recreational use of National Forest land which aggregates twelve hours. It may consist of one person for twelve hours, two people for six hours, or any combination that totals twelve hours.

RECREATIONAL RIVER - Wild and Scenic Rivers Act Usage. Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some devlopment along their shorelines, and that may have undergone some impoundment or diversion in the past.

REDUCED SERVICE MANAGEMENT - Management of developed recreation facilities below optimum maintenance standards.

REFORESTATION - The natural or artificial restocking of an area with forest trees.

REGENERATION - (1) The actual seedlings and saplings existing in a stand. (2) The act of establishing young trees naturally or artificially.

REGENERATION CUT - Removal of trees with the intention of establishing a new crop of seedlings.

REGIONAL FORESTER - The Forest Service official responsible for administering a single Region.

REGIONAL GUIDE - The plan developed to meet the requirements of the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended, that guides all natural resource management activities and established management standards and guidelines for the National Forest System lands of a given Region. It also disaggregates the RPA objectives assigned to the Region to the Forests within that Region.

REGULATED FOREST - Forest land managed for timber production under sustained yield principles.

REGULATIONS - 36 CFR refers to the Code of Federal Regulations for implementing the National Forest Management Act.

RESEARCH NATURAL AREAS - An area in as near a natural condition as possible which exemplifies typical or unique vegetation and associated biotic, soil, geologic, and aquatic features. This area is set aside to

preserve a representative sample of an ecological community primarily for scientific and educational purposes; commercial and general public use is not allowed.

RESOURCE DATA BASE - Information about resources stored in a computerized system.

REST-ROTATION - A grazing schedule in which the pastures being grazed receive a year of rest for plant recovery.

RETENTION (VQO) - A visual quality objective which in general, means man's activities are not evident to the casual forest visitor.

REVEGETATION - The reestablishment and development of plant cover. This may take place naturally through the reproductive processes of the existing flora or artificially through seeding, planting, or other action.

RIGHT-OF-WAY - Land authorized to be used or occupied for the construction, operation, maintenance, of a project facility passing, over, upon, under, or through such land.

RIPARIAN - Referring to land adjacent to perennial streams, lakes, and reservoirs and including other well developed riparian vegetation (primarily intermittent streams). This land is specifically delineated by the transition ecosystem and defined by soil characteristics and distinctive vegetation communities that require free and unbound water.

ROAD DENSITY - The measure of the degree to which the length of road miles occupies a given land area, i.e., 1 mi/sq. mi. is one mile of road within a given square mile.

ROAD MAINTENANCE LEVELS - Levels are described as follows:

Level 1: Road normally closed to vehicle traffic. Basic custodial care to protect surrounding resources and the road investment.

Level 2: Road open to traffic- Level 1 care plus minimum maintenance for passage of high clearance vehicles.

Level 3: Road open for public traffic - Level 2 care plus maintence needed for safe passenger car useage. User comfort (smooth surface) is not emphazised.

Level 4: Road open for public traffic. Level 3 care plus more consideration for safety at higher speeds and more traffic volume. User comfort is a consideration.

Level 5: Road open to public traffic. Level 4 care plus maintenance needed to ensure user safety and comfort. Maintained for highest traffic volumes.

ROAD PRISM - The geometric features of a road structure including all the disturbed area within a given portion of road. These features include the cut bank, ditch, travel surface, and the fill slope.

ROADED NATURAL ROS CLASS - A classification of the Recreation Opportunity Spectrum that characterizes a predominantly natural environment wioth evidence of moderate permanent alternate resources and resource utilization. Evidence of the sights and sounds of man is moderate, but in harmony with general ervironment. Opportunities exist for both social interaction and moderate isolation from sights and sounds of man.

ROADLESS AREA - Undeveloped Federal land within which there are no roads maintained for travel by means of motorized vehicles.

ROADLESS AREAS REVIEW AND EVALUATION II (RARE II) - A National program which had the purpose of identifying areas for wilderness and making recommendations to Congress regarding their designation.

RODENTICIDE - An agent that kills, repels, or controls rodents.

ROS CLASS - See "Recreation Opportunity Spectrum."

ROTATION - The planned number of years between the start of a crop of trees and their final harvest. The rotation age will vary according to geographic location, tree species, and management objectives.

ROUNDWOOD - Trees that are used without being milled (fence posts, telephone poles, pulpwood, etc.).

RPA - The Forest and Rangeland Renewable Resources Planning Act of 1974. Also refers to the National Assessment and Recommended Program developed to fulfill the requirements of the Act. The most recent recommended program was done in 1980.

RPA NATIONAL ASSESSMENT - A document compiled by the Secretary of Agriculture every ten years which contains facts and analyses to develop and guide public and private forest and range land policies and programs.

RPA NATIONAL PROGRAM - A document compiled by the Secretary of Agriculture every five years which outlines Forest Service programs for National Forest System management, cooperative assistance to States and private landowners, and research.

RURAL ROS CLASS - A classification of the Recreation Opportunity Spectrum that characterizes an area in which the sights and sounds of man are prevalent and the landscape has been considerably altered by the works of man.

RVD - See "Recreation Visitor Day."

SALVAGE CUTTING - Done to harvest trees in imminent danger of being killed or damaged by injurious agents. Dead and dying trees are included in salvage cuttings.

SAPLING - As used in timber survey, a size class definition; trees 1.0 to 4.9 inches at DBH.

SATELLITE IMAGERY - A pictorial representation of the earth obtained from a satellite.

SATISFACTORY RANGE CONDITION - Rangeland in range condition clas of at least fair with stable or upward trend.

SATISFACTORY WATERSHED CONDITION - Ground cover conditions are effectively maintaining land productivity, and the frequency and severity of damaging floods is within management tolerances.

SAWTIMBER - Trees that will yield logs suitable in size and quality for the production of lumber.

SCARIFICATION - Loosening the topsoil in open areas to prepare for planting, seeding or natural seedfall.

SCENIC EASEMENT - Relative to the Wild and Scenic Rivers Act [P.L. 93-621] 1975, and by definition of the act; the right to control the use of land [including the air space above such land] within the authorized boundaries of a component of the Wild and Scenic Rivers System, for the purpose of protecting the natural qualities of a designated wild, scenic or recreational river area, but such control shall not affect, without the owner's consent, any regular use exercised prior to the acquisition of the easement.

SCENIC RIVER - Wild and Scenic Rivers Act usage. Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.

SCOPING PROCESS [NEPA usage] - The public and management activities used to determine the range of actions, alternatives, and impacts to be considered in an environmental impact statement.

SEDIMENT - solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water,gravity, or ice and has come to rest on the earth's surface either above or below sea level.

SEED CUT - A cutting which leaves adequately spaced seed-bearing trees and opens the stand to provide conditions for restocking and establishment of a new stand of trees. Under a shelterwood system, the first of the shelterwood cuttings.

SEEDLING - As used in timber survey, a size class definition; trees less than one inch at DBH.

SELECTION CUTTING - The annual or periodic harvest of trees, usually the oldest or largest trees, individually or in small groups from an uneven-aged forest, as a means for encouraging continous natural reproduction and maintenance of an uneven-aged condition.

SEMI-PRIMITIVE MANAGEMENT AREA - A wilderness management area characterized by moderate opportunity for solitude in a predominately unmodified natural environment, with a moderate degree of trail maintenance.

SEMI-PRIMITIVE MOTORIZED ROS CLASS - A classification of the Recreation Opportunity Spectrum characterized by moderately dominant alterations by man, with strong evidence of primitive roads and trails.

SEMI-PRIMITIVE NON-MOTORIZED ROS CLASS - A classification of the Recreation Opportunity Spectrum characterized by few modifications by man, and with high probability of isolation from the sights and sounds of man.

SENSITIVE AREAS - Areas of high erosion hazard, areas that may be susceptible to compaction, or areas of unstable slopes.

SENSITIVE SPECIES - Those plant and animal species identified for a Region for which population viability is a concern.

SENSITIVITY LEVEL - As used in Visual Quality Management; a particular degree or measure of viewer interest in the scenic qualities of the landscape.

SERAL - A transitory, developmental stage in the process of ecological succession for a biotic community.

SHEET EROSION - The removal of a fairly uniform layer of soil from the land surface by runoff water, without the development of conspicuous water channels.

SHELTERWOOD CUT - An even-age regeneration system designed to establish a new crop under a protion of the old stand, which provides both the seed source and shelter for the new seedlings. The mature trees are removed in two or more cuts. (1) The preparatory cut removes a portion of the mature trees and is intended to make the remaining trees more wind firm; preparatory cuts may be omitted where windfall is not a major concern. (2) The seed cut removes additional trees with the intent of allowing additional sunlight to reach the forest floor. The new trees become established following the seed cut. (3) The removal cut removes the last of the mature trees.

SHRUB/SEEDLING - A forest successional stage in which shrubs and seedling trees are the dominant vegetation.

SIGHT DISTANCE - In wildlife management, the distance at which hiding cover is effective. (See hiding cover)

SILVICULTURAL SYSTEM - The entire process by which forest stands are tended, harvested, and replaced. It includes all cultural practices performed during the life of the stand such as regeneration cutting, thinning, improvement cutting, and use of genetically improved sources of tree seeds and seedlings. Silvicultural systems can be distinguished as either even- or uneven-aged.

SITE PREPARATION - Preparation of the ground surface before planting or preparing a seedbed for natural regeneration; includes removal of unwanted vegetation, slash, stumps, and roots from a site.

SKID TRAIL - Travelway used to drag or transport trees from the stump to the road.

SLASH - Debris left after logging, pruning, thinning, or brush cutting. It includes logs, branches, bark, and stumps.

SMALL GAME - Birds and small mammals normally hunted or trapped.

SNAG - Standing dead tree larger than six inches in diameter at breast height.

SOFT SNAG - A standing dead tree from which the leaves and most of the branches have fallen and which has started to rot internally.

SOFTWOOD - A conventional term for both the timber and trees belonging to the botanical group, Gymnospermae.

SOIL PRODUCTIVITY - The capacity of a soil in its normal environment, to produce a specific plant or sequence of plants under a specific system of management.

SOIL SURVEYS - Systematic examinations of soils in the field and in laboratories for the purpose of describing, mapping and classifying them according to their adaptability and behavior. There are 5 classified orders of surveys, with order 1 being the highest intensity through order 5 (lowest intensity).

SPECIAL CUTTING - Removal of trees for other than silvicultural purposes. This applies to unregulated area such as developed recreation and administrative sites where other uses or values are overriding.

SPECIAL USE PERMIT - A permit issued under established laws and regulations to an individual, organization, or company for occupancy or use of National Forest land for some special purpose.

STAND - An aggregation of trees or other growth occupying a specific area and sufficiently uniform in composition (species), age arrangement, and condition as to be distinguishable from the forest or other growth on adjoining areas.

STAND EXAMINATION SURVEYS - Procedures used to collect data on Forest stands.

STANDARD - A principle requiring a specific level of attainment, a rule to measure against.

STATE AIR QUALITY REGULATIONS - The legal guidelines for control of air pollution sources in a state.

STRUCTURAL DIVERSITY - Variety in a forest stand that results from layering or tiering of the canopy. An increase in layering leads to an increase in structural diversity.

STRUCTURAL RANGE IMPROVEMENT - Any type of range improvement that is man-made (fences, corrals, etc.).

SUBDIVISIONS - Subdivided land. Areas of previously undeveloped land divided into individual homesites and/or blocks of lots with streets or roads and open spaces.

SUBSOIL - The layer below the soil surface in which roots normally grow.

SUCCESSION - Ecologic succession. An orderly process of biotic community development that involves changes in species, structure, and community processes over time.

SUITABILITY - The appropriateness of applying certain resource management practices to a particular area of land, as determined by an analysis of the economic and environmental consequences and the alternative uses foregone. A unit of land may be suitable for a variety of individual or combined management practices.

SUITABLE RANGE - Range which is accessible to livestock or wildlife, and which can be grazed on a sustained yield basis without damage to long-term productivity.

SUITABLE TIMBER LANDS - Forest lands which can be managed for timber production on a sustained yield basis without damage to long term productivity.

SUPPLY - A schedule of the quantity of a product or forest output that will be produced at various prices.

SUPPRESSION (FIRE SUPPRESSION) - Any act taken to slow, stop, or extinguish a fire. Examples of suppression activities include line construction, backfiring, and application of water or chemical fire retardants.

SUSTAINED YIELD - The achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the National Forest without impairment of the productivity of the land.

TARGETS - Objectives assigned to the Forest by the Regional Plan.

TENTATIVELY SUITABLE FOREST LAND - Land for which technology is available that will ensure timber production without irreversible resource damage to soils, productivity, or watershed conditions. There is reasonable assurance that such lands can be adequately restocked as provided in CFR 219.13(h)(3).

TEMPORARY ROAD - A road that will be physically obliterated and seeded after its primary use is completed (i.e., spur road for logging); it will never be used again. (See TERMINAL ROAD)

TERMINAL ROAD - A road closed for a period of time (such as the interval between timber sales in an area), but planned to remain in place and be used again in the future.

THINNING - Cutting made in an immature crop or stand, primarily to accelerate the diameter increment (annual growth) of the residual trees, but also by suitable selection, to improve the average form of the trees that remain.

THERMAL COVER - Cover used by animals to reduce effects of weather; for elk, a stand of coniferous trees forty feet or more tall with an average crown closure of seventy percent or more, and a minimum of thirty acres in size.

THREATENED AND ENDANGERED SPECIES - Threatened and endangered species are animals or plants identified by the Secretary of Interior in accordance with the 1973 Endangered Species Act. Threatened and endangered are separate classifications. Endangered means any species in danger of extinction throughout all or a significant part of its range. Threatened means any species that is likely to become endangered within the foreseeable future throughout all or a significant part of its range. Candidate species are: Category 1 are those species for which there is sufficient information to support listing, Category 2 are those species for which information is actively being sought to determine their status, and Category 3 are those species no longer being considered for listing, but which may be reevaluated if conditions warrant it.

THREE-STEP SHELTERWOOD - An even-aged silvicultural system in which in order to provide a source of seed and/or protection for regeneration, the old crop (shelterwood) is removed in three successive cuttings.

TIERING - Refers to the concept, when preparing an environmental impact statement, of avoiding repetitive discussions of any issues already covered in another, broader, environmental review. Subsequent

environmental documents can incorporate issues already discussed in previous documents by reference only and concentrate on issues specific to the subsequent action.

TIMBER - A general term for the major woody growth of vegetation in a forest area.

TIMBER BASE - The lands within the Forest capable, available, and suitable for timber production.

TIMBER HARVEST SCHEDULE - The quantity of timber planned for sale and harvest, by time period, from the area of land covered by the Forest Plan. The first period, usually a decade, of the selected harvest schedule provides the allowable sale quantity. Future periods are shown to establish that sustained yield will be achieved and maintained.

TIMBER PRODUCTION - The growing, tending, harvesting, and regeneration of regulated crops of industrial wood. Industrial wood includes logs, bolts, or other round sections cut from trees for industrial or consumer use, except fuelwood.

TIMBER SALE - See commercial timber sale.

TIMBER STAND IMPROVEMENTS (TSI) - A loose term comprising all intermediate cuttings made to improve the composition, constitution, condition, and growth of a timber stand.

TOPSOIL - The original or present dark-colored upper soil that ranges from a mere fraction of an inch to two or three feet deep.

TRACTOR LOGGING - Any logging method which uses a tractor as the motive power for transporting logs from the stumps to a collecting point, whether by dragging or carrying the logs.

TRAFFIC SERVICE LEVELS - Definitions of traffic service levels used as a basis for designing appropriate roads to fit the expected need. These are:

> Level A - Traffic is free flowing and mixed, with adequate passing facilities, and will accomodate expected traffic volume without restricting use. Safety features are a part of the design. User costs are minimized. Road surface is stable, smooth and relatively dust free for the normal use season.
>
> Level B - Similar to Level A, but accepts that congestion will occur, and some traffic controls will be needed during peak use periods.
>
> Level C - Traffic flow is slow and restricted, and may require backing or stopping to permit passing. User costs are considered, and a mix of users is allowed.
>
> Level D - Traffic flow is slow and restricted. Two way traffic may require backing to pass. Traffic volume is intermittent and normally associated with a single purpose. Minimal safety features are included. User costs are given little consideration. The road surface may be rough and irregular. Rutting and dusting is controlled only for soil and water protection.

TRAILHEADS - The parking, signing, and other facilities available at the terminus of a trail.

TRANSITORY RANGE - Land that is suitable for grazing use of a temporary nature over a period of time. For example, on particular disturbed lands, grass may cover the area for a period of time before being replaced by trees or shrubs not suitable for forage.

TRANSMISSION PIPELINE - A pipeline which carries gas or liquid from a producing field for central collection facility to a storage or consumption facility, usually over long distances.

TRAVEL MANAGEMENT - The administrative decision on the location and timing of road and trail closures.

TREE OPENING - An opening in the forest cover created by the application of even-aged silvicultural practices.

TRESPASS - The act of going on another's land or property unlawfully.

TSI - See "Timber Stand Improvement."

TWO-STEP SHELTERWOOD - An even-aged silvicultural system in which, in order to provide a source of seed and/or protection for regeneration, the old crop [the shelterwood] is removed in two successive cuttings.

TYPE CONVERSION - The conversion of the dominant vegetation in an area from forested to nonforested or one tree species to another.

UNCONSTRAINED MAXIMUM - Level of management defined as the highest possible level of a given output along with the costs associated with achieving it.

UNDERSTORY - The trees and other woody species growing under a more or less continuous cover of branches and foliage formed collectively by the upper portion of adjecent trees and other woody growth (the overstory).

UNEVEN-AGED SILVICULTURE SYSTEMS - The combination of action that result in the creation of forests or stands of trees, in which trees of several or many ages grow together. Cutting methods that develop and maintain uneven-aged stands are individual tree and group selection cutting methods.

UNPATENTED MINING CLAIM - A claim made for possession of locatable minerals on public domain land (e.g., National Forests). A properly recorded claim entitles the claimant to reasonable access to the claim and exclusive right to extract and sell valuable minerals from the claim. Unpatented mining claims may be occupied and used solely for mining and related activity.

UNREGULATED HARVEST - This harvest is not charged against the allowable sale quantity, and includes occasional volumes removed that were not recognized in calculations of the allowable sale quantity, such as cull or dead material and noncommercial species and products. It also includes all volume removed from nonsuitable areas. Harvests from nonsuitable areas will be programmed as needed for objectives such as research on experimental forests, to meet multiple use objectives such as research on experimental forests, to meet mutiple use objectives other than timber production, and for improvement of administrative sites.

UNSATISFACTORY RANGE CONDITION - Rangeland in poor or very poor range condition or in fair condition with a downward trend.

UNSATISFACTORY WATERSHED CONDITION - Effective ground cover conditions are such that impairment of land productivty is occuring. The probability and frequency of damaging peak flows exceeds tolerable levels.

UNSUITABLE LANDS - Lands not allocated to timber management or not suitable as determined through the suitability analysis.

URBAN ROS CLASS - A classification of the Recreation Opportunity Spectrum in which the natural setting is dominated by man-made structures and the sights and sounds of man predominate.

USC - United States Code. A codification of all the general and permanent laws.

UTILITY CORRIDOR - A tract of land of varying width forming a passageway through which various commodities such as oil, gas, and electricity are transported.

UTILIZATION STANDARDS - Standards established to guide the use and removal of timber and measured in terms of minimum size and percent soundness.

VARIETY CLASS - A classification system for establishing three visual landscape categories according to the relative importance of the visual features. This classification system is based on the premise that all landscapes have some visual values, but those with the most variety or diversity of visual features have the greatest potential for having a high scenic value.

VEGETATIVE MANIPULATION - The change of one vegetation type to another through some land treatment such as fire, chemicals, etc. This is done to improve forage production, benefit wildlife habitat, or achieve some other desired result.

VERTICAL DIVERSITY - The diversity in an area that results from the complexity of the above ground structure of the vegetation; the more tiers of vegetation or the more diverse the species make-up, or both, the higher the degree of vertical diversity.

VIABLE POPULATIONS - A wildlife or fish population of sufficient size to maintain its existence over time in spite of normal fluctuations in population levels.

VIS (VISITOR INFORMATION SERVICES) - A service provided to the public by National Forests in which the public is supplied with information regarding activities and features on National Forest land.

VIS SITE - Visitor Information Service Site which provides interpretative information (directional, historical, geographic, natural history, etc) to the public.

VISITOR DAY - A statistical measure of visitor use. The use of an area for a total of twelve person hours by one or more people, either continuously or over several visits.

VISUAL DISTANCE ZONES - Areas of landscapes denoted by specified distances from the observer. Used as a frame of reference, in which to discuss landscape characteristics or activities of man. The three zones are Foreground, Middleground, and Background.

VISUAL MANAGEMENT PROGRAM - Also refereed to as "Landscape Management" or "Visual Resource Management"; guiding the use of forest lands in such ways that the visual effects maintain or upgrade the human visual experience. It is the planning and design of visual aspects of multiple-use land management.

VISUAL QUALITY OBJECTIVE (VQO) - A desired level of excellence based on physical and sociological characteristics of an area. Refers to the degree of acceptable alterations of the characteristic landscape.

Preservation (P). In general, human activities are not detectable to the visitor.

Retention (R). In general, human activities are not evident to the casual Forest visitor.

Partial Retention (PR). In general, human activities may be evident but must remain subordinate to the characteristic landscape.

Modification (M). Human activity may dominate the characteristic landscape but must, at the same time, utilize naturally established form,line,color, and texture. It should appear as a natural occurrence when viewed in middleground or background.

Maximum Modification (MM). Human activity may dominate the characteristic landscape, but should appear as a natural occurrence when viewed as background.

Enhancement. A short-term management alternative wich is done with the express purpose of increasing positive visual variety where little variety now exists.

VISUAL RESOURCE - The composite of basic terrain, geologic features, water features, vegetative patterns, and land use effects that typify a land unit and influence the visual appeal the unit may have for visitors.

WATER YIELD - The total net amount of water produced on the Forest including streamflow and groundwater recharge.

WATERSHED - The entire area that contributes water to a drainage or stream.

WATERSHED CONDITION - A description of the health of a watershed, or portion thereof, in terms of the factors that effect hydrologic function and soil productivity.

WETLANDS - Areas with shallow standing water or seasonal to year-long saturated soils (includes bogs, marshes, and wet meadows).

WFUD (WILDLIFE AND FISH USER DAY)- A unit for measuring wildlife and fish recreation user activities. A unit is the combination of use which aggregates to twelve visitor hours.

WHEELED SKIDDERS - A motorized wheeled vehicle specifically designed to skid logs.

WILD AND SCENIC RIVER CORRIDOR - See "Wild River" and "Scenic River."

WILD RIVER - Wild and Scenic Rivers Act usage. Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted.

WILDERNESS - Under the 1964 Wilderness Act, wilderness is undeveloped Federal land retaining its primeval character and influence without permanent improvements or human habitation. It is protected and managed so as to preserve its natural conditions which (1) generally appear to have been affected primarily by the forces of nature with the imprint of man's activity substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and confined type of recreation; (3) has at least 5,000 acres or is of sufficient size to make practical its condition; and (4) may contain features of scientific, educationak, scenic, or historical value as well as ecologic and geologic interest.

WILDERNESS RECREATION OPPORTUNITY MANAGEMENT AREAS - Delineated areas in wilderness which have different use characteristics and degrees of trail development. The four management areas are Transition, Semi-primitive, Primitive, and Pristine.

WILDERNESS STUDY AREA (WSA) - One of the areas selected by Congress from an inventory of unroaded and undeveloped National Forest lands as having apparent high qualities for wilderness. They will be studied to determine whether they should be recommended for addition to the National Wilderness Preservation System.

WILDFIRE - Any wildland fire that requires a suppression action. This includes all fires not meeting the requirements of a prescribed fire.

WILDLIFE HABITAT - The sum total of environmental conditions of a specific place occupied by a wildlife species.

WILDLIFE STRUCTURE - A site specific improvement of a wildlife or fish habitat, such as a spring development or dugout to provide water, brushpile for cover, nestbox for birds, or rock and log placement in a stream for fish cover and pool creation.

WINTER RANGE - The area occupied by an animal species during the winter.

WITHDRAWAL - Withholding an area of Federal land from settlement, sale, location, or entry, under some or all of the general land laws, for the purpose of limiting activities under those laws in order to maintain other public values in the area or reserving the area for a particular public purpose or program.

WORK CENTER - A facility where crews assemble and are directed toward their various work assignments. A work center can be located at an administrative site. A work center normally will include storage and shop facilities and may include crew housing.

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